

UNIVERSITY OF KWAZULU-NATAL

**Data analytics on customer friendly insurance products at Universal
Healthcare Services in Johannesburg**

By

Pitso Chaka

Student Number:

218024170

**A dissertation submitted in partial fulfilment of the requirements for the
degree of Master of Business Administration**

**Graduate School of Business & Leadership
College of Law and Management Studies**

Supervisor: Dr Bibi Zaheenah Chummun

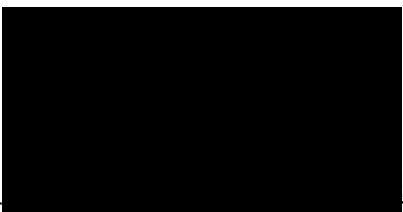
Year of submission

2020

DECLARATION

I, **Pitso Chaka**, declare that:

- The research reported in this dissertation, except where otherwise indicated, is my original work.
- This dissertation has not been submitted for any degree or examination at any other university.
- This dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.
- This dissertation does not contain other persons' writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then:
 - a) Their words have been re-written but the general information attributed to them has been referenced;
 - b) Where their exact words have been used, their writing has been placed inside quotation marks, and referenced.
 - c) Where I have reproduced a publication of which I am author, co-author or editor, I have indicated in detail which part of the publication was actually written by myself alone and have fully referenced such publications.
 - d) This dissertation does not contain text, graphics or tables copied and pasted from the Internet, unless specifically acknowledged, and the source being detailed in the text and in the References section.



Pitso Chaka

218024170

2021/03/05

Date

ACKNOWLEDGEMENTS

I wish to express my sincere appreciation and gratitude to the following individuals, without whose assistance, this study would not have been possible:

- To my supervisor, Dr Bibi Zaheenah Chummun, for her guidance and support.
- To my company, UHS, and all the employees and managers who participated in this research and supported me in my efforts.
- To my family, for the sacrifices that they made to enable me to finish my studies.

ABSTRACT

Data analytics can be used to enhance operations by giving firms information about their consumers, thereby helping maximise profit. The aim of the study was to investigate data analytics on customer friendly insurance products at the Universal Healthcare Services in Johannesburg. This data can be used to ensure that insurance companies are able to put their customers at the centre and focus of the product design process. This can be done by designing products for the customer, through the use of evidence contained in the data about what the customers need. The study was conducted using a non-probability sampling for a quantitative study that had a sample of 80 participants from the product design and data analytics teams, out of which 65 respondents completed the survey. The questionnaire was used to assess the role of data analytics in the design of customer friendly products and also review the challenges UHS face when collecting data for product design. The primary data were analysed using Qlikview, an analytics and data visualisation tools used to assess data in conjunction with Microsoft Excel. Key findings showed that data is regarded important within UHS and its benefit towards product design is well understood. Data security is seen as a significant issue by consumers and professionals alike as the privacy of the consumers has to be always kept in mind. Investment in data infrastructure and increase in allocation of resources to both the product design and data analytics team need serious attention. Top management is required to make performance metrics clear in order to give the employees confidence that the work they do will not be credited to someone else, as this may lead to a loss in rewards to the deserving personnel. The synergy that can be achieved by having the product design and the data analytics teams work together, will go a long way towards increasing performance. Further studies should explore the direct impact of data analytics on other insurance companies. Further studies should explore the relationship of data analytics and how it affects business performance at UHS. Additionally, future studies can also be used to assess how data analytics affect company revenues on a short and long term basis. The limitation of this study was that the research was only restricted to Universal Healthcare Services, as it was not extended to other forms of healthcare. Another limitation to this study was that it only focused on the team that were based in Gauteng as the research did not consider the teams based in other provinces.

TABLE OF CONTENTS

DESCRIPTION	Page
DECLARATION	ii
ACKNOWLEDGEMENTS	iii
ABSTRACT	iv
List of Figures	x
CHAPTER 1 INTRODUCTION	11
1.1 INTRODUCTION	11
1.2 PROBLEM STATEMENT	11
1.3 BACKGROUND	12
1.4 AIM OF THE STUDY	13
1.5 FOCUS OF THE STUDY	13
1.6 RESEARCH QUESTIONS	13
1.7 RESEARCH OBJECTIVES	14
1.8 MOTIVATION FOR THE STUDY	14
1.9 RESEARCH METHODOLOGY	15
1.10 LIMITATIONS OF THE STUDY	16
1.11 OUTLINE OF THE DISSERTATION	16
1.12 SUMMARY	17
CHAPTER 2 a perspective of data analytics in customer friendly products	18
2.1 INTRODUCTION	18
2.2 RELEVANT KEY DEFINITIONS	18
2.2.1 DATA ANALYTICS	18

2.3	PRODUCT DESIGN	20
2.3.1	ESSENTIAL CONSIDERATIONS OF PRODUCT DESIGN	21
2.3.2	PRODUCT DESIGN PROCESS FLOW	21
2.3.2.1	BRAINSTORMING AND IDEATION	22
2.3.2.2	CONCEPTUALISATION	23
2.3.2.3	PROTOTYPING	24
2.3.2.4	DEVELOPMENT	24
2.3.2.5	TESTING	25
2.3.3	MARKET LAUNCH	26
2.4	DATA ANALYTICS PROCESS FLOWS	27
2.4.1	DATA COLLECTION	28
2.4.2	DATA TRANSFORMATION	28
2.4.3	DATA VISUALISATION AND ANALYSIS	29
2.5	DATA ANALYTICS ON CUSTOMER FRIENDLY INSURANCE PRODUCTS	30
2.5.1	DATA ANALYTICS AND BUSINESS REVENUE	31
2.6	EVIDENCE-BASED DECISION MAKING	32
2.7	EMPIRICAL STUDIES OF DATA ANALYTICS ON INSURANCE	34
2.7.1	BIG DATA ANALYTICS TOWARDS MORE ENHANCED INSURANCE BUSINESS MODEL	34
2.7.2	IMPACT OF BIG DATA AND MACHINE LEARNING ON INSURANCE	35
2.8	CHALLENGES AROUND DATA COLLECTION FOR CUSTOMER FRIENDLY PRODUCT DESIGN	36
2.8.1	CONTEXT DEPENDENCY	36
2.8.2	DATA INTERPRETATION AND COMPLETENESS OF INFORMATION	36
2.8.3	NATURE OF THE DATA	37
2.8.4	INDIVIDUAL COGNITIVE LIMITATION	38
2.9	SUMMARY	38

CHAPTER 3	RESEARCH METHODOLOGY	39
3.1	INTRODUCTION	39
3.2	AIM OF THE STUDY	39
3.3	RESEARCH PARADIGM	39
3.4	RESEARCH DESIGN METHODS	40
3.4.1	QUALITATIVE DESIGN	40
3.4.2	QUANTITATIVE DESIGN	40
3.4.3	MIXED METHODS	40
3.5	STUDY SETTING	41
3.6	POPULATION OF THE STUDY	41
3.7	SAMPLING METHODS	41
3.7.1	PROBABILITY SAMPLING	41
3.7.2	NON-PROBABILITY SAMPLING	42
3.8	CONSTRUCTION OF THE INSTRUMENT	42
3.9	DATA COLLECTION	43
3.10	DATA ANALYSIS	43
3.11	RELIABILITY AND VALIDITY OF THE STUDY	43
3.12	ELIMINATION OF BIAS	44
3.13	ETHICAL CONSIDERATIONS	45
3.14	SUMMARY	45
CHAPTER 4	results and discussion	46
4.1	INTRODUCTION	46
4.2	DATA SUMMARY AND ANALYSIS	46

4.3	DEMOGRAPHICS	46
4.3.1	EDUCATION	47
4.3.2	SENIORITY	47
4.3.3	FUNCTION	48
4.3.4	LEVEL OF EXPERIENCE	49
4.4	THE ROLE OR IMPORTANCE OF DATA ANALYTICS IN THE DESIGN OF CUSTOMER FRIENDLY PRODUCTS.	49
4.4.1	STATEMENT A	49
4.4.2	STATEMENT B AND C	51
4.4.3	STATEMENTS D, E AND F	52
4.4.4	STATEMENTS G AND H	54
4.5	THE CHALLENGES ENCOUNTERED WHEN COLLECTING DATA FOR THE DESIGN OF CUSTOMER FRIENDLY PRODUCTS.	55
4.5.1	STATEMENT I AND J	55
4.5.2	STATEMENT K AND L	57
4.5.3	STATEMENT M AND N	58
4.6	MITIGATION FOR CHALLENGES WHEN COLLECTING DATA FOR THE DESIGN OF CUSTOMER FRIENDLY PRODUCTS.	59
4.6.1	STATEMENT O	59
4.6.2	STATEMENT P	60
4.6.3	STATEMENT Q, R AND S	61
4.7	SUMMARY OF DATA FINDINGS	63
4.8	SUMMARY	64
chapter 5 CONCLUSIONS AND RECOMMENDATIONS		65
5.1	INTRODUCTION	65
5.2	RECAP OF RESEARCH QUESTIONS AND OBJECTIVES	65
5.3	OUTCOMES AND SUMMARIES FROM LITERATURE REVIEW AND PRIMARY DATA	66

5.4	STUDY CONCLUSIONS	67
5.5	STUDY RECOMMENDATIONS	68
5.5.1	USE OF SURVEYS TO MITIGATE CHALLENGES	68
5.5.2	BALANCE BETWEEN CUSTOMISATION AND COMPLEXITY	68
5.5.3	USE OF DATA ANALYTICS IN IMPROVING BUSINESS REVENUE	68
5.5.4	AVOIDING IRRELEVANT DATA AND MISINTERPRETATION	68
5.5.5	ROLE OF DATA ANALYTICS AWARENESS	68
5.6	LIMITATION OF THE STUDY	69
5.7	SCOPE FOR FURTHER STUDY	69
5.8	CONCLUSION	69
REFERENCES		70
APPENDIX A Gate Keeper's Letter		78
APPENDIX B Cover Letter		79
APPENDIX C Informed Consent		80
APPENDIX D Questionnaire		81
APPENDIX E Turnitin Report		85
APPENDIX F Editorial Certificate		86
APPENDIX G Ethical Clearance Approval		87

List of Figures

Figure 2-1: Product Design Process Flow	22
Figure 2-2: Extract, Transform and Load Process	27
Figure 2-3: Evidence Based Decision Making Triple Intersection	33
Figure 4-1: Level of Education	47
Figure 4-2: Seniority Levels	48
Figure 4-3: Functions of Respondents	48
Figure 4-4: Years of Working Experience	49
Figure 4-5: Statement A	50
Figure 4-6: Statement B and C	51
Figure 4-7: Statements D, E and F	53
Figure 4-8: Statements G and H	54
Figure 4-9: Statements I and J	56
Figure 4-10: Statements K and L	57
Figure 4-11: Statements M and N	58
Figure 4-12: Statement O	59
Figure 4-13: Statement P	60
Figure 4-14: Statements Q, R and S	62

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Data analytics has evolved globally and its corresponding influence on business operation is growing. This study investigates data analytics on customer friendly insurance products at Universal Health Services (UHS) in Johannesburg. This study sought to establish the extent to which this happens within UHS Services and the challenges experienced in this effort. This chapter outlines some background on data analytics, also highlighting the research problem, study background and the research focus. This chapter also presents the study objectives as well as the research questions. The motivation for this study was further addressed in this chapter, in addition to an overview on research methodology, limitations of the study and the outline of the dissertation.

1.2 PROBLEM STATEMENT

The role of big data analytics is taking a foremost position to the process of new product development efforts for many leading firms across the globe (Yu & Yang, 2016). For many companies, the necessity of leveraging on essential knowledge that big data analytics offers is almost sort of the base to business competition in the present day dynamic business environment (Yu & Yang, 2016). Therefore, it is no surprise that companies are interested in big data as it assists them to better understand customer dynamics, enhanced product design and development, and to also offer their customers a more customised services (Wuthrich & Buser, 2019). Companies typically use the traditional product development processes that involve teams of product designers or developers, either brainstorming or coming up with what they think the markets needs or reacting to a competitor's product that has had market success. This process is unpredictable and the same applies to the results. UHS follows this same process. This has resulted in many products where considerable resources had been invested in the development stage, failed when launched to the market and some even being shelved before going to market at all.

All this leads to a waste of resources that could otherwise be well invested elsewhere.

On the other hand, organisations such as UHS, amongst other functions, have a growing quantum of data that they collect for regulatory and financial reporting about their customers. Big data deals with dataset with a size that can be captured, communicated, combined, stored and assessed. Other sources of big data that are essential includes the plurality of sources such as internet clicks, mobile transactions, user created contents and social media (Mehta & Pandit, 2018). This data can give very clear insights into customer preferences, needs and behaviour. There is a growing need for companies to use the data that they collect about their customers in order to inform product design, thereby eliminating guesswork and decisions based on instinct. Customer data is a focus area for many businesses as it deals with consumer behaviour and predictive data analytics (Freedman, 2020). A number of businesses consistently capture, store, and evaluate large amounts of data on their consumer base daily. Because some of these companies have built their entire business model around consumer data, it is clear that consumer data is very huge for businesses (Freedman, 2020). This space has not been well researched and consequently, there are no industry wide standard methodologies that can guide how product design can be aided by data and data analytics.

This research will focus on how UHS can use the data that they have in their possession and guide them on how to collect supplementary data in order to achieve this. Additionally, it will provide the marketing team at UHS with a clear, evidence-based profile of who the target market for the product will be, thereby reducing cost of marketing to a wider audience than necessary. This research will not only give recommendations on how UHS can benefit from using data analytics in the design of customer-friendly products, it will also establish the importance of data analytics in the design process, investigate the challenges that the organisation faces when collecting data for product design and suggest ways to alleviate those challenges.

1.3 BACKGROUND

South Africa has a mature insurance industry with varied product lines. In 2014, the total expenditure of the South African private healthcare was over R142 Billion

(Econex, 2015). When the companies in this industry are put together, their market capitalisation is well in excess of R1.5 Trillion (Econex, 2015). Some of the big players include Liberty Health, Momentum Health and Discovery Health. In their last health industry overview, it was reported that while the amount of claims continues to increase significantly, the collections or revenue has remained for the most part steady (PWC, 2016). The report indicated that claims increased at the rate of just over 15% year on year, while revenue increases at less than 10% per year (PWC, 2016) which brings to the forefront the importance of differentiation in this sector.

For a company to survive and thrive, it has to find what makes it different and utilise those available resources. Data is a very valuable resource that can be used as a differentiator. Companies in the private health insurance sector have come up with ways to respond to the lack of funds by introducing products such as Discovery's Vitality, Momentum's Multiply and UHS's 360° plan (PWC, 2016).

These products not only help companies' gain better understanding of their clients' health needs. They are also used as incentives to encourage a healthy lifestyle, leading to less claims from serious illnesses which can cost a fortune to treat. The main beneficiaries of this study are the academic community, the insurance industry, members of the public who are part of these loyalty programmes and regulators of this industry.

1.4 AIM OF THE STUDY

The main aim of this study was to assess data analytics on customer friendly insurance products.

1.5 FOCUS OF THE STUDY

The focus of the study centres on data analytics, products, the use of technology and how it affects customer friendly insurance products at UHS.

1.6 RESEARCH QUESTIONS

This study is aimed at answering the following questions:

1. What is the role and importance of data analytics in the design of customer friendly products at Universal Healthcare Services?
2. What are the challenges that Universal Healthcare Services encounter when collecting data for the design of customer friendly products?
3. What can be done to mitigate those challenges when collecting data for the design of customer friendly products?

1.7 RESEARCH OBJECTIVES

The research objectives for this study are as follows;

1. To establish the role and importance of data analytics in the design of customer friendly products at Universal Healthcare Services.
2. To assess the challenges that Universal Healthcare Services face when collecting data for product design.
3. To identify recommendations on the extent to which these challenges can be mitigated.

1.8 MOTIVATION FOR THE STUDY

In general, UHS and the healthcare industry have a shortage of studies that investigate the role that data analytics play, in aiding the design of products that will both meet the needs of customers and maximise profit for organisations. This research is very important as it seeks to explain how data can be used to make the customer a focus in the product design process and identify the gap that exist in the current process of product design undertaken by UHS. Additionally, it will look at the relationship that exists between the product design process and the data collection process in order to identify the challenges that the organisation encounters when collecting data for product design.

The findings from this study will help UHS to understand the importance of data collection and analysis in the design of customer friendly products, as it will also highlight challenges and product recommendations on how these challenges can be mitigated. The findings from this study will additionally help improve profitability by helping organisations to focus their efforts and resources on products that have

a higher likelihood of market success. These improvements will help customers by providing them with products that suit their needs. Hence, they will additionally help the healthcare industry as a whole through the provision of better methodologies for product design that is infused with data analytics. In addition, the findings from this study will be of interest to professionals in the health sector, especially product designers and sales teams. Product designers from other fields such as banking and other service oriented industries could also explore the findings and recommendations in their respective fields. Data analytics practitioners and Information Technology (IT) personnel in general can also learn the best approach of engaging their stakeholders, in order to achieve meaningful change based on their work.

1.9 RESEARCH METHODOLOGY

This research was carried out in Johannesburg, while the survey was emailed to 80 participants who were notified via WhatsApp to check their emails and requested to respond accordingly. This study was carried out using a quantitative method as the nature of the data required from a study usually drives the type of research method applied. According to Bernerth, Taylor and Cole (2018), the selection of a research method is largely influenced by the nature of the data collection and information required by the research. The questionnaire was used to elicit the views and opinions on the participants about questions posed by the study. There was a total of 65 respondents that participated out of 80 participants, which resulted in a response rate of 81.25%.

The research utilised a non-probability type of sampling specifically known as Judgemental sampling. This type of sampling method is applied when there is a particular purpose in the researcher's mind (Bernerth et al. 2018). For this study, the researcher used judgemental sampling because of the technicalities of the subject matter. As a result, the data collection focused on individuals working in product sales, product and benefit design, and data analytics fields.

The data obtained from the surveys were collated and interpreted objectively to gauge the opinion of these respondents. Qlikview, an analytics tool and data visualisation tool were used to analyse the data collected in conjunction with

Microsoft Excel. The ethical guidelines as laid out by the University of KwaZulu-Natal (UKZN) were always adhered to and the research material and participants were handled with appropriate sensitivity.

1.10 LIMITATIONS OF THE STUDY

This study centred solely on data analytics on insurance products. This study was restricted to UHS and did not extend to other forms of healthcare. Also, it focused only on the team that are based in Gauteng and did not consider other provinces. Hence, the outcome of this study should not directly be applied to other industries.

1.11 OUTLINE OF THE DISSERTATION

This study will be presented in five chapters as shown below;

Chapter 1 – Introduction and Background

This chapter deals with the overview of the study. This includes the reason for conducting the study and high-level view of methodologies to be employed during the research process.

Chapter 2 – Literature Review

This chapter focuses on the literature review. An assessment of what is already known in literature is made and gaps identified accordingly.

Chapter 3 – Research Methodology

This chapter delves deeper into the contents of chapter one, the methodologies, research paradigms, research design, sampling methods, testing of reliability and validity are articulated more verbosely in this section. The aspects of the study that underpins researcher methodology is discussed in this section.

Chapter 4 – Results, Findings and Discussion of Findings

In this chapter, data collected from the study is presented and analysed as well as the findings stemming from the whole study. For instance, it compared the primary data outcome with literature review. The results are interpreted and findings explained.

Chapter 5 – Conclusions and recommendations

This chapter sums up the whole study by bringing the objectives together with the findings.

1.12 SUMMARY

This chapter outlined the study in its totality. It covered pertinent aspects such as the background, problem statement, focus of the study, the question that the study seeks to answer and the objectives that are to be achieved. The structure outline of the full dissertation was presented and descriptions given on what each chapter covers. The next chapter covers the literature review that sets the tone for what body of knowledge already exists, what still needs to be covered and how this study proposes to fuse different concepts of product design and data analytics together.

CHAPTER 2

A PERSPECTIVE OF DATA ANALYTICS IN CUSTOMER FRIENDLY PRODUCTS

2.1 INTRODUCTION

The previous chapter reviewed the introduction and the study background. This chapter will explore the academic literature already conducted in this space. Previous views and opinions from other researchers were looked into and commonalities between those and this study established. It will serve as a basis and guideline for the rest of the study as it will try to confirm some of the findings on the one hand and also presenting new findings and evidence on the other hand.

2.2 RELEVANT KEY DEFINITIONS

Below are quick definitions of relevant key words that applies to this research study. They include;

2.2.1 Data Analytics

This is known as the science of evaluating raw data, in order to provide conclusions regarding that information (Frankenfield, 2020). A different definition defines data analytics as the process of evaluating datasets to extract conclusion regarding the information they contain (Lotame, 2019). In essence, it helps the user to take raw data and reveal patterns to draw unique insights from the data (Lotame, 2019). Data analytics can also be seen as a discipline that is centred on extracting insights from data (Olavsrud, 2021). It usually encompasses aspects such as the processes, tools and techniques of data analysis and management, including the gathering, arrangement, and data storage (Olavsrud, 2021). The concept of data analytics is valuable as it enables businesses to optimise their performances, which can result in the implementation of new models to revive overall company performance (Frankenfield, 2020). In addition, business executives and senior management leadership use of data analytics in making business decisions (Lotame, 2019).

Strategic Management – This deals with the management of a company resources in order to realise specific goals and objectives (Kenton, 2020). It is also seen as the continuous planning, monitoring, analysis and assessment of all necessities an organisation requires to meet its goals and objectives (Tucci & Roy, 2019). Changes in business environments will demand organisations to steadily assess their strategies for success (Tucci & Roy, 2019). Hence, the concept of strategic management enables organisations to review the present situation, map out strategies, deploy them and analyse the effectiveness of the implemented management strategies (Tucci & Roy, 2019).

Some of the activities involved in strategic management includes outlining objectives, evaluating the competitive environment, assessment of the internal organisation, analysing and roll out of strategies (Kenton, 2020). The strategic management process is beyond a set of rules to follow, but a philosophical approach to business (Clayton, 2019). In addition, the idea of strategic management process is best implemented when everyone in the organisation understands the strategy (Clayton, 2019).

Competitive Advantage – This is known as specific drivers that empower a company to produce better services than their rivals (Twin, 2020). It enables a firm to generate greater value and benefits the shareholders as a result of unique strengths or specific conditions (Twin, 2020). It also refers to the factors or attributes that allow a given company to produce more affordable or higher quality services or products than its competitors (Amadeo, 2020). According to Hough, Thompson, Strickland and Gamble (2011), anytime rivals can readily duplicate successful strategy features, making it difficult or impossible to overcome this rivals and beat them in the marketplace, it reveals that the organisation need to review their competitive advantage. In essence, competitive advantage is what makes an entity's goods or services superior to all of a customer's other choices (Hough et al., 2011). Although the name is commonly used for businesses, the strategies work for any organisation, country, or individual in a competitive environment (Amadeo, 2020).

Product Design – This is known as the means of selecting a specific market opportunity, evaluating the problem and building ideal solution for that problem, thereby authenticating the solution with actual users (Babich, 2018). The concept of product design describes the process of imaging, creating, and iterating products that solve users' problems or address specific needs in a given market (Nieberding, 2019). The details of the product design process will usually vary from one company to another, but the concept tend to follow a similar framework when it comes to the design thinking (Smyth, 2019). Another view considers product design as the process of identifying a market opportunity, clearly defining the problem, developing a proper solution for that problem and validating the solution with real users (Lo, 2020). Product design is very unique as designers utilise the framework to solve problems and deliver outstanding uniqueness in maintain the competitive advantage of an organisation (Lo, 2020).

2.3 PRODUCT DESIGN

The importance of data is vital in the design of any product and essentially vital when there is need for a correlation (Nieberding, 2019). An evolving aspect of research in the technology environment is the utilisation of data analytics for the transitioning of information into knowledge, in order to design more enhanced systems, products and processes (Lewis & Van Horn, 2013). Product design involves the creation of a new product, from ideation, conceptualisation, prototyping, development to testing and going to market. It has been stressed that buyers and suppliers need to engage in this process collaboratively, because product design success is vitally dependent on the views of customer and service provider respectively (Lewis & Van Horn, 2013). Additionally, worthy product design may imply the difference that could arise a product failure and market success (Smyth, 2019). Product design begins with innovation or the gathering of new ideas through brainstorming sessions, where there are no refusal on anything possibly wrong, as all options are potential recommendations (Golder & Mitra, 2018).

2.3.1 Essential Considerations of Product Design

According to Smyth (2018), valuable considerations that are vital during product design are essential. It is highlighted that these deliberations and contemplations are aspects that should not be ignored during product design (Smyth, 2019). They include;

- a. Customer will have vital expectations towards the product quality, safety, reliability, and so on. A good product is required to meet these minimum requirements.
- b. The capability to produce the designed product is very crucial, as the producing plant should be able to meet the market needs.
- c. A stable supply of required raw material is vital, as this will ensure production of the desired product.
- d. A proper understanding regarding the production cost and selling price is very important. A clear understanding of the cost price and selling price is essential as it can help the producer to readjust the product design step.
- e. Impact of the new product on existing product need to be given valuable consideration. This is essential as sometimes older products are disregarded and discarded as the emphasis is on the newer products.

2.3.2 Product Design Process Flow

Designing the product involves the creation of a new product; which ranges from ideation, conceptualisation, prototyping, development to testing and going to the market. According to Marques, Tadeu, De Brito and Almeida (2017), the traditional product design process includes brainstorming, prototyping and testing the proposed product with a small sample of users within the targeted demographic. Golder and Mitra (2018) stressed that buyers and suppliers need to engage in this process collaboratively. The buyer and supplier can be considered as the customer and service provider respectively. Sometimes, a business may launch a new product in response to a competitor's product or service, thus they may go about this process in a very unstructured way without due care of what the customers need even when there are data that can easily show them behavioural patterns (Marques et al., 2017). The findings of the product design process will inform the decision to

either continue with the development and eventually taking this to market or to cancel the project entirely; this is also an inward looking process where the key focus is on the product and its functionality (Golder & Mitra, 2018). The Figure 2-2 below shows the product design flow process.



Figure 2-1: Product Design Process Flow (Source: Marques et al., 2017)

The steps below based on Figure 2-1 will detail what each stage of product design involves and how these steps can be improved with the use of data.

2.3.2.1 Brainstorming and Ideation

Many companies when engaging in the process of product development begin by hosting brain-storming sessions. It is during these sessions that as many ideas as possible are suggested about what new products or services the company can offer. These ideas can be completely new ideas or improvements on existing products or services. The common mantra of a brain-storming session is that nothing is too crazy to suggest, and no idea should be rejected as patterns (Marques et al., 2017). The practicality and feasibility of an idea will be explored at later stages, in order to keep the creative momentum going without having participants worrying about whether their ideas will sound impractical to others in such sessions. This stage does not require any financial investment except for the cost of organising the session patterns (Marques et al., 2017).

While these types of sessions are good at bringing about new and innovative ideas, they are usually not founded on any evidence which is not necessarily a bad thing (Mehta & Pandit, 2018). The acceptability of the idea can be tested later using data as evidence, by having people work with the data, assess them and provide

feedback on their findings. This step can include gaps in product or service offerings, as varying configurations of the same product or service can make them easier to be sold to the customers. Brainstorming sessions can also be thought of as data collection stages, as they enable the firm to introduce new ideas into the team; those team can end up being potential users of the product. Clinton, Townsend, Bird and Albano (2019) highlighted that insurance ideas sometimes come about as using an idea that already exists, where someone attempts to initiate a difference with what the market offers currently. Brainstorming is very crucial for product design process and must be carefully assessed to maximise full benefits in product design processes (Clifton et al., 2019). The next stage of product development is conceptualisation, this stage is sometimes lumped together with brainstorming, but it can be thought of as a stand-alone stage.

2.3.2.2 Conceptualisation

The stage of conceptualisation encompasses more thought and high-level technical details of the idea that are explored (Clifton et al., 2019). At this stage, some of the outright impractical ideas or suggestions can be discarded. This is easier to do at this stage because the individual who suggested the idea has to really think about the idea in terms of how it will actually work, what will be needed to make it work and other such factors. Ideas that are completely unfeasible will be identified and in most cases they are not discarded but rather shelved for later use (Marques et al., 2017).

Additionally, the conceptualisation stage relies on prior knowledge of the market in which the new service or product is to be introduced (Berg & Vance, 2017). It is essential to have as much details about the products and the intended recipients. Supporting data collected through evidence-based analysis is vital in supporting the idea at this stage. There is also no financial investment made on the product or service during conceptualisation; as the level of financial involvement will become important at the next stage which is prototyping (Berg & Vance, 2017).

2.3.2.3 Prototyping

The stage of prototyping includes making small scale version of the new product and showcasing how it will work, or story boarding the new service and showing how it will be used (Marques et al., 2017). This stage involves making more apparent the financial implications of the idea. While the prototype itself should be produced as cheaply as possible if not completely free, it is vital to start thinking of the types of costs that will be involved when this new service is developed at full scale. All the features of the service have to be clear and interactions between different parts of the new product can be explored as practical thoughts are given on its operation ability (Devadiga, 2017).

A prototype is sometimes referred to as the proof of concept; it identifies the major functional designs of the intended product without being bogged down by the smallest details (Devadiga, 2017). A prototype product should be expected to have limitations that will not necessarily be there on the final product, and such limitations are brought about by simplistic design and a lack of a full-scale development process (Marques et al., 2017). Some reviews as outlined by Devadiga (2017) have advised that the prototype can outperform the final product because of the very same factors mentioned here, this is rather counter-intuitive but it has been proven to have happened. A prototype is akin to growing a specimen in a laboratory, hence it is vital to take into consideration the real-world conditions and try possibly to emulate them. It is for this reason that data about the environment in which the product is to live is crucial (Marques et al., 2017).

2.3.2.4 Development

The development stage deals with the detailed, low level or technical design of the product (Marques, et al., 2017). The prototype that has been hitherto discussed is developed at full scale, having conducted a feasibility analysis and decided to go ahead with it.

Devadiga (2017) discussed some of the critical success factors of product development and these include; ensuring that the product development process is followed studiously, making sure that the top management of the firm buys in on the new product and the product development process. There is also the need to make

sure that the technology needed to bring the new product to life exists or can be acquired (Golder & Mitra, 2018). If technology is acquired, then cost of this acquisition as well as the cost of the product itself needs to be taken into consideration (Marques et al., 2017). This is to ensure that the product is market oriented and not wishful thinking on the part of the team engaged with development, as this speaks to market research which is the crux of evidence based decision making and lastly, making sure that the products fits with the bigger strategic goals of the firm (Lewis & Van Horn, 2013).

2.3.2.5 Testing

Testing is perhaps one of the most important parts of this entire process and part of the reason is that the product needs thorough testing to ensure that it goes to market without any glitch (Lewis & Van Horn, 2013). A well-developed product can fail because there are malfunctioning issues which the end user experience, that could have been avoided or detected by the development team. According to Koestoer, Roihan and Andrianto (2019), in most software or information and communication technology (ICT) environments, a product can be launched in test mode and this is usually referred to as beta mode. This mode enables an entire community of users to test the product in order to help identify issues before the product launch (Koestoer et al., 2019). The benefit of testing stage to users is that they see the new products and features before everyone else; while the benefit to the development team is that they have a first-hand feel of the product behaviour in a real-world setting (Koestoer et al. 2019).

The testing stage also helps with the development of an accurate and non-deceptive marketing strategy, as the team will know exactly what the product can and cannot do (Lewis & Van Horn, 2013). As a result, they can formulate a marketing strategy that speaks to the strengths of the product and its corresponding services. The testing process always refers to the initial intent of the development, to ensure that the product delivers the results it claims to deliver and that consumers can derive the expected corresponding product value (Koestoer et al., 2019). Additionally, it is at this stage that the product is compared to other similar products in the market and the proposed value add is ascertained.

2.3.3 Market Launch

In the market launch stage, there are multiple important things that need to be considered. One of them is making sure that the right audience is targeted, which happens through identification of the target market by means of segmentation using demographics in addition to other tools (Sajid, 2019). Also, it is of utmost importance to ensure that the market launch message is packaged in a manner that is clear; such that there is distinction between the product and that of the competitor, thereby highlighting unique product value proposition (Sajid, 2019). Another important aspect is the selection of the appropriate product channel; this involves the optimum use of both traditional and new digital media platforms with the intention of strongly delivering the message (Unilever, 2019).

Manning, Massini, Peters and Lewin (2018) outlined that one of the best ways to market a product is to ensure that customer service for early adopters are of paramount importance. This is vital as these early adopters will likely spread the message of how good the new product is via word of mouth, blogs, social media and other such platforms. Regardless of how good the product is, if this particular demographic has bad experience with it, it will be difficult to convince the larger public to buy into your marketing message as the early adopters are perceived as the neutral or objective user.

When going to the market, the marketing mix of price, product, promotion and place should be utilised. The product has to be affordable to its intended consumers to ensure commercial success, which should be fit for purpose and cover all the elements required by the clients (Manning et al., 2018). Additionally, the product should be well promoted to increase awareness amongst its user base using appropriate strategies and it should be placed within the right segment in terms of the standard of the living standard measure (Chummun & Bisschoff, 2014). It is important for users to buy into the product, which is vital as it helps to convince more of the market. When going through all of these stages from ideation to market launch, the team has to ensure that they keep the customer because they remain the central focus of the product design and market launch (Narayanan, 2016). Customer centricity should be the mantra of the entire product team and they should ensure that they have done their best to meet the highest standards (Gilliland,

2019). The next section deals with data analytics specifically as in this process too, the customer should always be of upper most importance.

2.4 DATA ANALYTICS PROCESS FLOWS

Data analytics deals with the methods of examining datasets to draw conclusions about the information they contain (Lotame, 2019). The method of data analytic helps in processing raw data in order to uncover patterns to extract meaningful information from it (Lotame, 2019). Wuthrich and Buser (2019) indicated that it is important not to gain insights from data analytics but that these insights have to be translated into value adding propositions within firms. Many organisations have woken up to the fact that their data is valuable, even though they struggle to quantify just how much value exists and how this value can be derived and exploited of which the researcher has had a first-hand experience with (Wuthrich & Buser, 2019).

A number of companies have moved from traditional reporting into electronic format. The healthcare industry has vast amounts heterogeneous data that can be used in many ways, which includes improving care and reducing waste (Pickell, 2019). The area of data analytics is an evolving aspect. For simplicity and clarity, data analytics is an encompassing term which includes; data science, data robotics and big data (Wuthrich & Buser, 2019). Further review of literature shows that data analytics has been growing in areas such as; supply chain management and human resource management. Kwon, Lee and Shin (2014) argue that while the need for optimal use of data resources grow, the skills are not keeping up with the demand which is a major problem. The Figure 2-2 below shows Extract, Transform and Load (ETL) diagram.

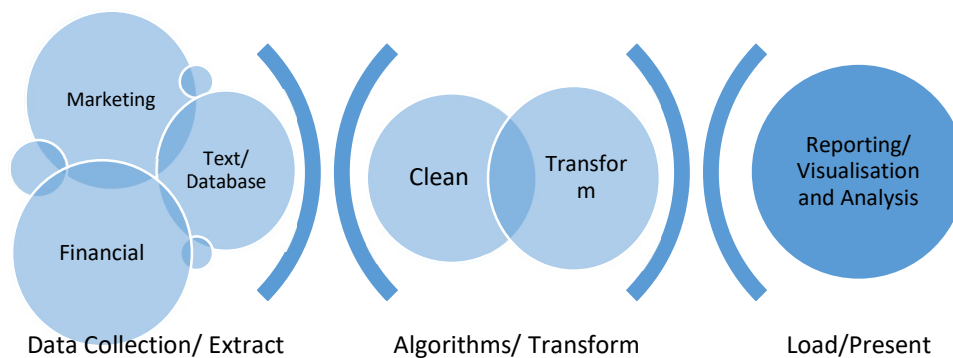


Figure 2-2: Extract, Transform and Load Process (Source: Lohiya et al, 2017)

The Figure 2-2 above deals with different facets and intricacies of data analytics. It will also provide context and help decipher the language used in data analytics space by the practitioners, as well as to show where analytics and products design can have synergies. ETL is a process that extracts the data from various sources, after which the data is transformed and finally uploaded into the Data Warehouse system (Lohiya et al. 2017). The next section explains the various stages of the ETL.

2.4.1 Data Collection

Ghosh, Olewnik, Lewis, Kim and Lakshmanan (2017) indicates that this is the first stage of any project that involves the use of data and mainly focuses on extraction. In comparison to the brainstorming in the product design process, what is gathered at this stage will be available for use later. The data collected is very useful as it bears the required information, which is also useful in that it is in a readable format or can be relatively easily converted to other format (Ghosh et al., 2017). It must be of sizeable quantity, descriptive of the parameters being sought, and have enough depth in order to make meaningful trends analysis.

2.4.2 Data Transformation

This stage involves taking collected data and getting it in the format required if it was not received in such a format. This helps to ensure that the data is fit for purpose by separating tables and fields that need to be separated (Ghosh et al., 2017). Typically, collected data will be in multiple formats when received, which will then be entered in the database or the tool that can do such data manipulation task (Ghosh et al., 2017). As a result, this is then converted into a single format. This data will be cleaned by removing unwanted characters, duplicated data, and aligning tables that need to be joined or separating tables that need to be separated (Lohiya et al., 2017).

In course of data transformation process, care should be taken to ensure that confidentiality of the data is respected and that dissemination happens in ways that are in line with government principles (Ghosh et al., 2017). Additionally, it is important to ensure that the requisite technical skills are available and that the

hardware requirements necessary to run these processes are met. Because of this, practitioners in the data analytics and produce design must work together to ensure that the end goal is realised. Data analytics personnel will ensure that the right algorithms are written and the product design personnel must ensure that they communicate the requirements in a clear manner to the analytics team (Wuthrich & Buser, 2019). The analytics team does more than just process the data, but actually assist with analysis.

2.4.3 Data Visualisation and Analysis

Data visualisation and analysis have been considered to be the same thing. Data analysis is an exploratory process that often starts with specific questions; requires curiosity, the desire to uncover answers and a good level of tenacity (Murray, 2019). A well designed report makes analysis easier and the design of the report is part of visualisation. Visualisation speaks to the visual design of the report by presenting data in a way that is both interesting and easy to interpret. The most basic aspects of visualisation is to ensure that there is balanced design, a theme that makes sense and speaks to the intended audience, a variety of objects that are used and that these objects are used in the right proportions. This is normally achieved with the use of dashboard which is an excellent and very effective method for communicating insights (Murray, 2019). The dashboard should also illustrate where there is movement or big changes, thereby highlighting key areas.

The next step under data visualisation and analysis would be the interpretation and analysis of the data. Under this, the information is turned into knowledge by the reader or user. This is achieved through applying existing user knowledge of the subject matter and supplementing it with new information contained in the report (Wuthrich & Buser, 2019). It is usually recommended that product designers should work closely with data analysts to complement each other's strength, as this helps to make a meaning from what the report is showing them (Lohiya et al., 2017). By using data analytics as part of the product design, the team will be subscribing to the principle of evidence based decision making, in pursuit of making customer centricity the focus of the whole process (Murray, 2019).

2.5 DATA ANALYTICS ON CUSTOMER FRIENDLY INSURANCE PRODUCTS

Leveraging on data analytics by any business can truly revive a failing insurance business, turning it into a thriving one (Agababa, 2017a). According to Nayak, Bhattacharyya and Krishnamoorthy (2019), wearable technologies have increased the amount of data that companies have access to, like access to their clients' habits and behaviours. This data has also been used to predict future behaviour and design products that are fit for purpose and friendly to their customers (Hayes, 2020). The data from these wearable technologies have also been used to devise sales and commercial strategies and have enabled firms to decide on their target market for specific products (Nayak et al., 2019). According to Kopanakis (2020), the use of data analytics allow businesses to observe varying customer related patterns and trends.

Big data and analytics have transformed business practices and enabled firms to instantaneously create value and glean insights that can assist in making effective decisions (Nayak et al., 2019). Big data can also be used to address advertisement and marketing issues within an organisation; thereby helping to improve the level of risk management within the organisation (Kopanakis, 2020). Together with the help of outsourced parties, these insights have garnered skills that are internal to the firm. It is important at this point to distinguish between data and big data. Big data is usually described using the 5Vs (Volume, Velocity, Veracity, Variety and Value). These refer to the different qualities of data that must be of significant volume or size and must be data that is growing at a high speed or velocity (Agababa, 2017b). Veracity deals with data that has to be reliable and trustworthy and must be variable enough to be above, in order to explore different dimensions of a certain metric. In addition, the data must be of value or useful to the process that it is to be gathered.

Given the fact that the industry trend is a customer friendly business, clients are looking for trusted consultants that can assist them get the appropriate insurance that suits their needs (Agababa, 2017b). According to Sampson (2019), some designers are usually more comfortable in going with the approach of data analytics that they have always been conversant with, instead of transitioning to newer ideas. Data analytics can assist insurance brokers deliver that role. One of the core

benefits is that the intelligent insurance business platforms are now approving agents to utilise technologies that provide them with actionable insights that is dependent on customer data (Agababa, 2017b). Also, data analytics assists in increasing customer satisfaction and retention. For example, data analytics assists in making faster a number of other processes, such as policy issuing and communication after the sale. The impact is that a happier and satisfied customer who is more faithful may become a vivid promoter (Agababa, 2017a).

In addition to consumer friendly products, data has been used to inform the design and creation of sustainable and environmentally friendly products. According to Ren, Zhang, Liu, Sakao, Huisingh, Almeida (2019), what is usually referred to as smart manufacturing has increased in recent years and has moved from being solely a topic of academic interest into being a practice in the industry. There are frameworks of design that have been developed, that both the industrial manufacturing sector and insurance product design can benefit from when it comes to integrating design and analytics (Sampson, 2019). This is in order to come up with products that are not commercially viable, but that are user friendly and environmentally sustainable (Ren et al., 2019).

2.5.1 Data Analytics and Business Revenue

Data analytics makes use of latest scientific methods and processes to extract knowledge from data and leverage this data in making sound decisions (Kumar, 2019). Top management and decision makers in any organisations work closely with data, which services as predictive tools for their day to day and long term decisions (Tredgold, 2017). Sound decisions through data analytics are vital as they will assist in the increase of business revenue in an organisation (Kumar, 2019). Increased revenue through the use of data analytics is possible as market gaps or customer needs not currently met are identified, thus leading to complimentary products and services (Duggan, 2019). The use of data analytics offer predictive and prescriptive analytics as it helps to minimise physical device down time, leading to scheduled system maintenance that ultimately reduces downtime thereby leading to increases in business review and cost reduction (Duggan, 2019). Proper utilisation of data analytics helps businesses to quantify the impact of their revenue. Tredgold (2017) further opined that data analytics helps in increasing service level

performance, improves supplier management, maximises customer value and drives cost down.

2.6 EVIDENCE-BASED DECISION MAKING

According to Gandomi and Haider (2015), evidence-based decision making or management is a practice that gives emphasis to a rational, objective and experiential approach to addressing business issues. Barends, Rousseau and Briner (2014) opined that it helps businesses make well informed decisions regarding policies, programs and projects through utilising the best accessible evidence from research for the actualisation of policy development and implementation. A major line of thought for evidence-based practice is that sound and good quality decisions should be reliant on a summation of critical thinking and best available evidence (Barends et al., 2014). Krishnamurthy, Marcinek, Malik and Afzal (2018) revealed that this approach to decision making is applied by many management practitioners, not much attention is paid on the superiority of the evidence. This results in bad outcomes based on unfounded opinions and ideas that are majorly driven by experts in management (Gandomi & Haider, 2015). A major benefit of evidence-based practice is to improve the way decisions are made, as practitioners are made to pay close attention in ensuring that they trust the evidence they have before them (Barends et al., 2014). The Figure 2- below shows the evidence-based decision making triple intersection.

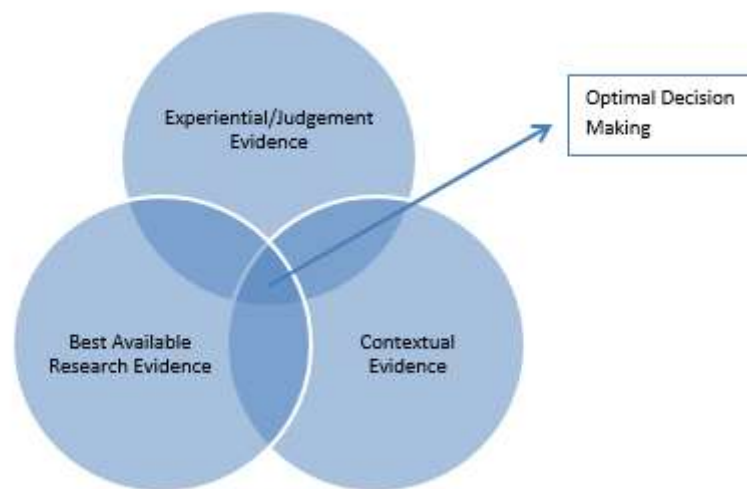


Figure 2-3: Evidence Based Decision Making Triple Intersection (Source: Krishnamurthy et al., 2018)

The Figure 2-3 above represents the three types of evidence. However, the importance of the diagram is that it depicts a common intersection which is a strong bedrock for optimal decision making. The beauty of this type of decision is that it integrates both tacit and explicit knowledge and brings in the environment within which the end product is to be used (Krishnamurthy et al., 2018). The core of data analytics is to help and enable evidence based decision making.

Mehta and Pandit (2018) asserted that the evidence based decision making approach type of thinking can benefit the design of an insurance product in a great way, as it fosters the attitude of using data, specifically in the case of this study which is the use of data analytics in conjunction with product design so as to achieve the intended outcome. The confluence of the three aforementioned type of evidence; experiential, research based and contextual is where optimal design of a product can be achieved in concurrence with the use of the product design processes (Mehta & Pandit, 2018). A core aspect to this evidence-based design process is that decisions made must be transparent, in that everyone should be aware of what is happening at all times (Mehta & Pandit, 2018). In this way, decisions should be participatory such that the team members are allowed to share their views and opinions that are helpful to the project. This type of approach helps

every member of the team to fully participate maximally during the implementation process (Ghosh et al., 2017)

The design process should be a well-defined process and the firm must have skilled leadership and facilitation of the implementation process. UHS has a dedicated General Manager of Business Analytics and a General Manager for Benefit Design, which for the purpose of this study is the same as product design. This type of senior level and managerial positions have great influence and they add value to the entire design process together. In order to ensure that evidence-based decision making takes place, the skills and knowledge of the senior management team is crucial (Mehta & Pandit, 2018). This underpins the fact that senior managers should oversee the implementation in order to ensure that it goes through without glitches and that they can also delegate responsibilities and ensure that each member of both the design and analytics teams are clear on their roles and responsibilities.

2.7 EMPIRICAL STUDIES OF DATA ANALYTICS ON INSURANCE

This section outlines some of the previous studies around big data, data analytics and other opinions based on previous studies.

2.7.1 Big Data Analytics Towards More Enhanced Insurance Business Model

Beginning of the 1990s have encountered the advent of a new concept know as big data. This is to balance the remarkable expansion of huge data amounts that need sincere ideas and techniques that should be dealt with. According to Senousy, Ghitany and Riad (2018), a large number of start-up companies are trying to deal with high data inflow and require predictive tools for future analysis. An important aspect is that the insurance sector is a data and information driven industry, which generates large amounts of records that could be structured or unstructured (Senousy et al., 2018). For instance, huge statistics analytics helps insurers take important selections depending entirely on the assessment of the gathered information. This makes big data and data analytics a good candidate for insurance companies, as it offers new solutions to bear with the challenging diverse types of huge data (Senousy et al., 2018).

This study analysed the added values of big data technology in comparison to insurance data processing and decision making requirements. This study further reveals that one of the biggest aspects of big data is to enhance the precision of predictive analysis, which influences the determination of risk, insurance claims and customer experience (Senousy et al., 2018). Some of the aspects where big data assist includes; fraud disclosure, collection of information, price optimisation, risk assessment and threat mapping, data automation, customer insight (Senousy et al., 2018).

This study also showed how the advances in big data analytics promise to alter the duties of data in the insurance business model. For example, big data technologies in alliance to other technologies allow for the growth of new business models, which in turn enable the role of insurance to move from a level of “understand and protect” to “predict and prevent”.

2.7.2 Impact of Big Data and Machine Learning on Insurance

Studies of McKinsey Global Institute and Boston Consulting Group (BCG) perspectives, some of the traditional slow-moving insurance businesses have lagged behind in utilising big data analytics in comparison to other financial services sector (Blanken, 2017). However, as the competition around insurance businesses grow, insurers have to take a positive stand by providing products that are less expensive over their rivals, increase their operational efficiency and provide perfect customer service (Blanken, 2017). The goal of this study was to investigate the impact of new data sources and big data analytics on the insurance industry. The empirical part of this study provides a practical guidance for insurers on how to apply and carryout the data-driven opportunities.

This study therefore revealed that a lack of skills, financial and other cultural drivers can provide answers as to why insurers profit from new data technology and data analytics with the same eagerness as other financial services. It was also revealed that other big challenge for insurers is to convert exponentially increase volumes of available data into useful insights in a more cost effective way. In order words, such businesses depending on the nature of the healthcare industries should make investments to shift full swing into the data analytics era. The study suggested that

Cross-Industry Standard Process for Data Mining (CRISP-DM) which is a frontline methodology and industry best practice for data mining and predictive analytics projects should be explored.

2.8 CHALLENGES AROUND DATA COLLECTION FOR CUSTOMER FRIENDLY PRODUCT DESIGN

The approach to data collection in the innovation, the design of customer friendly products and the entire design making process, shows that it is not a straightforward process. There is the need to account for a few challenges and difficulties that could emerge. These are as follows;

2.8.1 Context Dependency

According to Gorkovenko, Burnett, Thorp, Richards and Murray-Rust (2020), there are views that many of the decision makings are mostly reliant on the “context independence”. This implies that the preferred choice over two items does not rely on other options that may be readily available. In other words, if the intent of the new design is to develop a joint with the strongest resistance to stress, the decision makers will follow the concept that has the highest resistance to stress in course of their engineering simulations (Gorkovenko et al., 2020). As a result, one of the major challenges during data collection for customer friendly product design is that key decision makers will usually favour a concept due to their previous experience or direct use of products (Bertoni, 2018). In so doing, they evade the choice of ideas that look “harder or extreme” or out of line with the expected value prior to running the model. This challenge becomes more complex when a larger number of interests are involved in the product design.

2.8.2 Data Interpretation and Completeness of Information

In order to use data to create meaningful designs, it is important to connect the dots between the data and design improvements, in order to use the data to select your expected consumer desires or to even address their problems and needs (Babich, 2017). This is known as data interpretation and is a criteria in the design of customer friendly products. Under the interpretation of data, it is critical that the meaning of

the models used are correctly understood and transparent for the consumers (Bertoni, 2018). A misrepresentation of the collected data makes it difficult to create the expected product outcome, which can stall the entire design process (Babich, 2017).

Another important aspect that must be overcome is the completeness of the information required for the product design. Under this, there is a strong trade-off between the degree of the collected data and the importance of providing an effective analysis (Gorkovenko et al., 2020). In other words, it is paramount for the collected data to encompass multidimensional aspects that should be manageable by the consumers, without providing a wrong sense of accuracy during the assessment phase (Babich, 2017).

2.8.3 Nature of the data

The nature of data during product design can be another form of challenge. This means that the available data in course of design can be in a numerical and of a nominal form (Yu & Yang, 2016). This means that such data should be easy to be computed with all the necessary product features. It is vital for the data to be straight forward and unambiguous, as this will help the possibilities of misinterpreting the collected data (Gorkovenko et al., 2020). When data is misinterpreted by a firm, a different outcome could be potentially pursued that is outside the intended scope of design (Ren et al., 2019). Babich (2017) opined that the design product team should use both qualitative and quantitative data in order to comprehensively understand the product's usage pattern. This is important as it can help the design team in making an informed decision (Ngai, 2018). Also, the nature of the data should also not be irrelevant to the focal area of the customer friendly product design (Yu & Yang, 2016). Data could be irrelevant when they are not aligned to the purpose of the investigation or research towards the product design (Ngai, 2018). There have also been cases where there is duplication in the data collection, which is mostly human errors in course of the research work for the product design. Product design team need to be on the lookout for such duplications, as it can skew the intended design outcome (Babich, 2017).

2.8.4 Individual Cognitive Limitation

The last difficulty deals with information design and the corresponding limited cognitive capabilities of individuals to rationally analyse and manage a high amount of information in a short time (Bertoni, 2018). The challenge of cognitive limitation is typically overcome by the research and investigation in informative design. This deals with analysis, planning, presentation and comprehension of a message (Ngai, 2018). The utilisation of accurate information design strategy assists to inform, to make easier and to create information easy to get to while refining the clearness of communication (Bertoni, 2018).

2.9 SUMMARY

This chapter reviewed the applicable literature in line with the topic and scope. Some key definitions, product design and various stages in the product design flow were reviewed. Data analytics and the aspect of insurance products were also discussed. Empirical research on data analytics and the resource-based view as a theoretical framework was also assessed. The next chapter presents the research methodology.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter presents the research methodology that was applied in course of conducting this study. The research paradigm, design methods, study setting, population of the study, sampling methods, and construction of the research instrument were discussed in this chapter. This chapter also outlines the data collection, analysis approach, reliability and validity, elimination of bias and ethical considerations for the study.

3.2 AIM OF THE STUDY

The main aim of the study was to assess data analytics on customer friendly insurance products.

3.3 RESEARCH PARADIGM

According to Saunders, Lewis and Thornhill (2016), research paradigm speaks to the ontological, epistemological and the methodology used in conducting the research. It is a set of common understanding on how research can be conducted to be empirically valid (Saunders et al., 2016). The common paradigms are positivist, which seeks to explain the world through a single reality that can be measured; this approach often goes hand in hand with a quantitative approach (Saunders et al., 2016). The constructivist approach, sometimes referred to as interpretivist, espouses the belief that there is no single reality or lens through which all things should be observed (Cooper & Schindler, 2011). It seeks to bring nuance and interpretation as a quantitative method is best suited for this paradigm. To this end, this research adopts a positivist paradigm. In this approach, the researcher is independent and considers observable and measurable facts in a neutral and detached manner (Kivunja & Kuyini, 2017).

3.4 RESEARCH DESIGN METHODS

3.4.1 Qualitative Design

Qualitative method is descriptive and inductive in nature in that the research is more focused on the process, such that understanding is gained through interpretation of words (Surbhi, 2018). The data dealt with here is typically not numerical in nature and is often collected through the use of interviews, focus groups and observations (Saunders et al. 2016).

3.4.2 Quantitative Design

This method deals mainly with measurable data that can be represented in numerical term (Bhat, 2018). It focuses on objective measurement of results using statistical, mathematical and numerical analysis of the collected data (Cooper & Schindler, 2011). The data is usually collected through polls, questionnaires and surveys. Relationships between different metrics that the data expresses are the main focus of a quantitative study (McCombes, 2020).

3.4.3 Mixed Methods

Mixed methods refer to utilisation of both the qualitative and quantitative methodology together in the same study. This mix happens at data collection, analysis and when interpreting the data collected (Creswell & Creswell, 2018). It aids in adding breadth and depth of understanding through using both methods (Saunders et al., 2016).

This study was conducted through a quantitative approach. This is due to the fact that there are numerical issues that need to be addressed through a questionnaire by product designers and data analysts, thus the researcher sought to deal with measurable data that can be represented in numerical terms. The teams can help with the understanding of what strategies that can be employed towards the collection and use of data for the purpose of product design, in addition to potential challenges they face in their daily dealings with each other. Using a single method

provides depth to the study and takes away the complexity of dealing with two different methods of data collection and analysis (Rapley, 2018).

3.5 STUDY SETTING

A research setting can be seen as the physical, social and cultural site in which the researcher conducts the study (Creswell & Creswell, 2018). This research study was based in a Health Insurance setting and was focused on a large company. This study was carried out at the Universal Health Services based in Johannesburg and this selection was based on the discretion of the researcher.

3.6 POPULATION OF THE STUDY

There are two teams which were covered as participants of this study, the product or benefit design team and the data analytics team. Questionnaires were sent to them to be completed. The participants differed in terms of qualification, experience and seniority within the team. These participants were chosen due to their daily occupational responsibilities as this made them the target population by the researcher. This population were also willing to help in improving their current mode of operation as it concerns data analytics. The population size of this study was a total of 80, ranging from junior to senior team members and two heads of department. There were a total of 65 respondents that completed their questionnaires, which resulted in a response rate of 81.25%.

3.7 SAMPLING METHODS

This section outlined the two kinds of sampling methods and the kind that was selected for this study.

3.7.1 Probability Sampling

The probability sampling technique chooses a sample from a larger population using the theory or probability, in that anyone in the population has an equal chance of being chosen to participate (Bhat, 2018). Types of probability sampling include random selection, stratified sampling, cluster sampling and multistage sampling. The strength of this type of sampling technique is that it ensures that the sample

chosen is actually the representative of the larger population, since it was selected at random (Cooper & Schindler, 2011).

3.7.2 Non-Probability Sampling

This sampling technique does not give all samples or participants an equal chance of being selected, but is a targeted method of selection (Cooper & Schindler, 2011). Methods include quota sampling, convenience sampling, self-selection and purposive or judgement sampling. This type of sampling is open to self-selection bias and the researcher needs to be aware of it (Saunders et al. 2016). Under non-probability sampling, the researcher makes a judgement of who should constitute part of the sample, this means samples are not selected randomly.

Sampling method used was the non-probability sampling. A good number of scholars agree that when conducting research within highly specialised fields, it is prudent to use this method (Creswell & Creswell, 2018). Easy access to the participants and their willingness to contribute to the research process through surveys or questionnaires are some of the reasons for selecting the judgement sampling for this study. In addition, the specific knowledge of the desired population makes the used judgement sampling the most suitable.

3.8 CONSTRUCTION OF THE INSTRUMENT

The questionnaires were designed to use neutral language that is clear and easily understandable. Even though the same sample represent a more professional team, the use of unnecessary jargons and convoluted terms have been kept to minimum as far as possible. There is a correlation between the response rate and the reliability and validity of the results. To this end, the questions have been made easy enough to understand in order to ensure full participation. The questionnaires on the questionnaire were designed and revised multiple times to ensure clarity and that they are straightforward. A rating scale of 1 to 5 was used, were participants were asked to indicate their level of agreement or disagreement with the statements posed.

3.9 DATA COLLECTION

The questionnaire was distributed to the entire participants through the use of Survey Monkey platform. A link from the survey platform was then shared to the entire participants via email and prompted to complete the question. The questionnaire included a consent form that provided a summary on the study in order to ensure that the respondent participated voluntarily. The questionnaire link was activated to last for three weeks, after which the completed questionnaires were collated by the researcher.

3.10 DATA ANALYSIS

The data gathered from the questionnaires was typed or captured into a Microsoft excel spreadsheet for manipulation and analysis. It was then transferred from MS Excel into an application called Qlikview for the purpose of statistical analysis and visualisation. Once the data was entered into a spreadsheet, it was analysed to identify trends and other statistical metrics. The researcher utilised more of descriptive analysis for the data. Qlikview, a data visualisation and analysis tool was also used to understand this data and show patterns or trends that emerged from the data.

3.11 RELIABILITY AND VALIDITY OF THE STUDY

The envisaged methods ensured that the findings and interpretations are both valid and reliable. Reliability can be improved by making sure that the tests, or in this case survey questions are clearly explained and easily understood by the participants (Drost, 2011). To address the issue of validity, the researcher made sure that the instruments used actually measured what was being studied and that they are appropriate for the purpose they were intended for. The analysis of the results has to be so accurate, such that the research findings and claims made should be replicable and representative enough. The researcher as a colleague of the participants has a pre-existing relationship with them, since some of the participants were more senior and some junior to the researcher, it was therefore deemed representative enough.

Reliability of the study refers to the replicability of the study (Sekaran & Bougie, 2013). This assesses whether if there were repeated under the same conditions with the same participants, if it would produce the same outcome (Creswell & Creswell, 2018). Saunders et al., (2016) suggested Cronbach's alpha coefficient was one of the methods that can be used to measure reliability. It is used to measure the uniformity of responses received to a particular set of questions that are used to deal with a specific concept. An analysis was carried out using the 19 questions and 65 responses to these questions to compute Cronbach's alpha coefficient. The result of α from the calculation was 0.783. Saunders et al., (2016) Saunders, Lewis and Thornhill (2016) asserted that α that is greater or equal to 0.7 denotes that the set of questions as combined are measuring the same thing.

Internal validity was applied by making sure that there is a causal relationship between different variables under study. The phenomenon of causality versus correlation was taken note of. External validity refers to the extent to which findings from one study can be applied in a different setting (Creswell & Creswell, 2018). This was explored by using not only the experience the participants have in the current firm, but also by asking questions that required them to draw from their experience from other firms and their opinions in general (Saunders et al., 2016).

3.12 ELIMINATION OF BIAS

Bias occurs when the researcher allows their opinion or views to influence how they record, interpret and analyse results from their research study (Borowska-Beszta, 2017). This may be due to their vested interest in seeing a certain outcome or basic human instinct to be subjective (Borowska-Beszta, 2017). It is important for the researcher to not allow their personal views or dispositions to influence the way they interact with both the participants and the data or the research process in its entirety (Smith & Noble, 2014). Elimination of bias ensures that the researcher remains a neutral observer looking to find answers to their questions and their findings (Smith & Noble, 2014).

The survey form/questionnaire was utilised for data collection in this study, as it provided adequate tools used to review the feedback of the respondents. The utilised research instrument was made of open-ended questions. The researcher

ensured bias elimination by not discussing the details of the questionnaire with the participants, despite the fact that these were his colleagues. The researcher also ensured that the data outcome from the respondents as collected was presented without any alteration to their findings.

3.13 ETHICAL CONSIDERATIONS

Sanjari, Bahramnezhad, Fomani, Shoqhi and Cheraghi (2014) indicated that the interaction between researchers and participants are usually faced with ethical issues that must not be put aside. Ethics deals with and revolves around correctness in course of a research as it pertains the rights of the subject (Sanjari et al., 2014). The focus of this study is in the health insurance sector; therefore, due care was taken as some of the information available could be sensitive and confidential. The data was dealt with in an ethical manner with full cognisance of the Protection of Personal Information Act (POPI Act 4 of 2013). The university's ethical guidelines were also adhered to.

The researcher ensured that an informed consent preceded the questions in the questionnaire, in order to ensure that their willingness is acknowledged before participating in the survey. The idea behind the informed consent was to protect issues around coercion, thereby maintaining voluntary participation of the participants. The researcher applied and obtained ethical clearance (HSSREC/00000061/2019) letter prior to the commencement of the study which was issued by the University of KwaZulu-Natal (UKZN) Ethics Committee. A gatekeeper's letter was also obtained from UHS.

3.14 SUMMARY

This chapter reviewed the methodology of research related to the study. This chapter covered the research paradigm, research design method, study setting, study population and construction of the instrument. Additional aspects such as data collection, data analysis, reliability and validity, elimination of research bias and ethical considerations were covered. The next chapter presents the study results, findings and discussion of findings.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 INTRODUCTION

In this chapter, the results from this study are presented. The use of frequency and descriptive statistics together with narrative text were employed in order to analyse the feedback received from participants. Results were presented as graphs to show the relationship between the different concepts being covered; there was no need for complex statistical analysis for this study. The questions asked to the participants were grouped in a way that each groups speaks to a specific question posed in chapter one.

4.2 DATA SUMMARY AND ANALYSIS

There is a lot of overlap on each of these questions and during analysis some of these overlaps were exposed. In the end, all the questions were directed to answer the main question of this study. A total of 80 questionnaires were sent and 65 responses received and recorded, resulting in a response rate of 81.25%. This size of the sample and response rate and the construction of the instrument is representative enough to ensure validity and reliability.

4.3 DEMOGRAPHICS

The respondents were stratified according to different demographics. These included their level of education, seniority within the firm, the department that they work for and the number of years they have had in their respective fields.

4.3.1 Education

Figure 4-1 below shows respondents' level of education

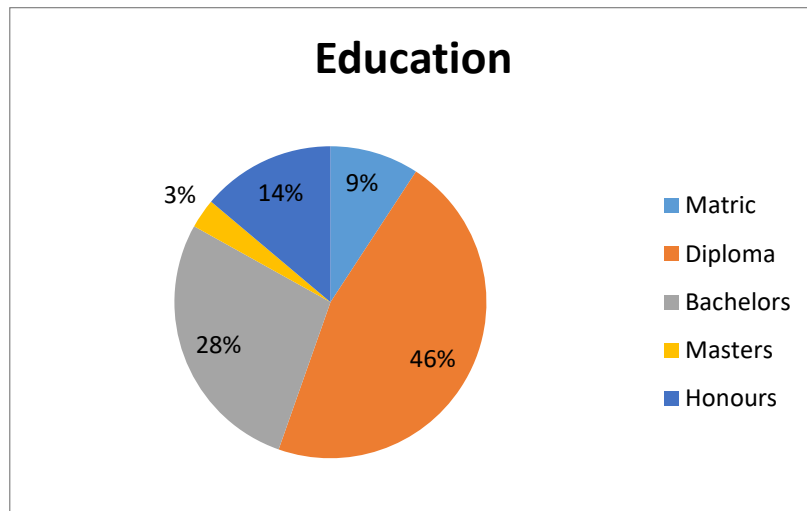


Figure 4-1: Level of Education

From the Figure 4-1 above, 46% had diploma, 28% had bachelor's degree, and 14% had honours degree while 3% had master's degree. The data analytics and product design field are specialised fields and as a result, employees within these teams tend to be educated people. UHS being a firm that offers specialised products and professional services, also requires and attracts educated people.

4.3.2 Seniority

Figure 4-2 below shows the level of seniority within the organisation.

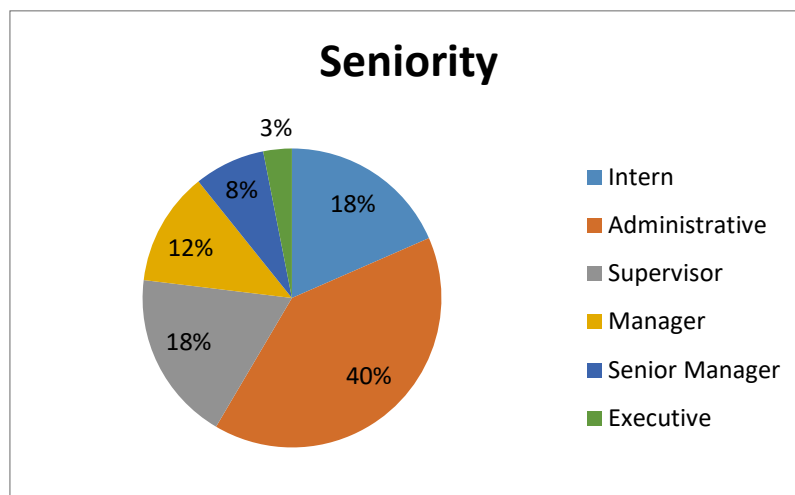


Figure 4-2: Seniority Levels

From the Figure 4-2 above, 18% are intern, 40% administrative staff, 18% supervisors, 12% managers, 8% senior managers and 3% executives. It is clear from the representation above that there appears to be a fairly equal distribution between the administrative and managerial employees. The outcome result from above also revealed that the interns were also represented in the organisation, even though not all of them will remain permanent employees when their contracts are over.

4.3.3 Function

Figure 4-3 below depicts the number of respondents from different functions within UHS.

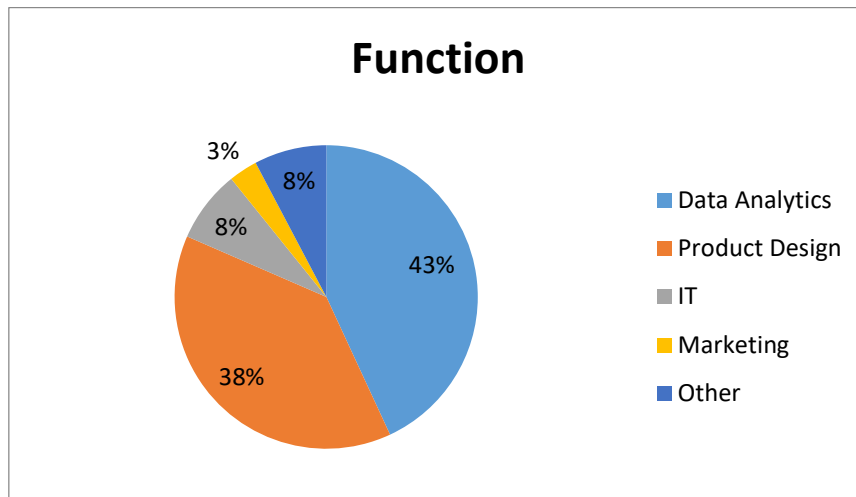


Figure 4-3: Functions of Respondents

From the Figure 4-3 above, it is 43% of the staff were involved in data analytics, 38% in product design, 8% in IT, 3% in marketing while the rest were involved in other functions that were not defined. However, the study focus was on the overlap of the data analytics and product design team; hence, 81% came from the two departments. Although the marketing team was not in the preview of the study, they do play an important role towards the launching of the product.

4.3.4 Level of Experience

Figure 4-4 below depicts the respondents years of working experience.

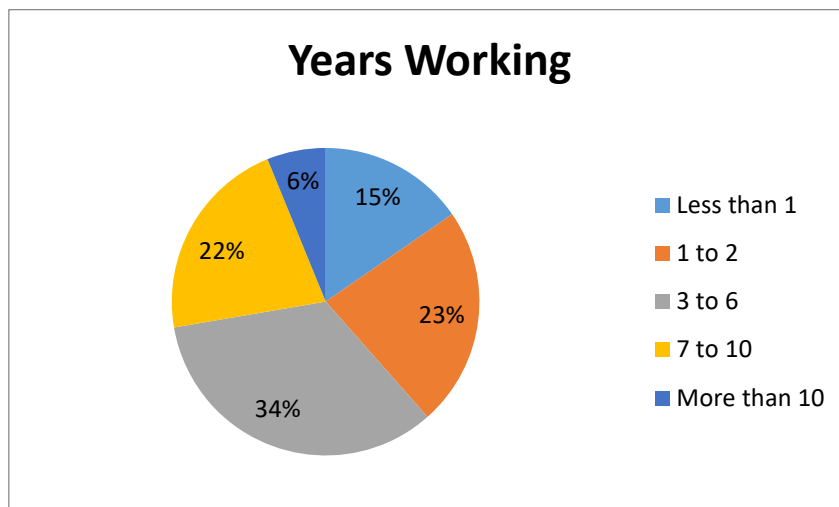


Figure 4-4: Years of Working Experience

From the Figure 4-4 above, 15% of the respondents had worked for less than 1 year, 23% for 1 to 2 years, 34% for 3 to 6 years, 22% for 7 to 10 years and the remaining 6% had worked for more than 10 years. The spread of the response above showed that majority of the years of experience category revolved around respondents who have had 10 years of experience or less. This further shows that UHS appears to have very young workforce which could be made up of younger graduates that are new in the labour market, in addition to some with more than 5 years' experience.

4.4 THE ROLE OR IMPORTANCE OF DATA ANALYTICS IN THE DESIGN OF CUSTOMER FRIENDLY PRODUCTS.

This section sought to understand the role and importance data analytics play towards the design of customer friendly products. Eight statements which the respondents reviewed are shown in this section.

4.4.1 Statement A

Figure 4-5 below outlines respondents' feedback to Statement (A).

A. Data analytics can be utilised in providing in-depth understanding of consumer insurance needs.

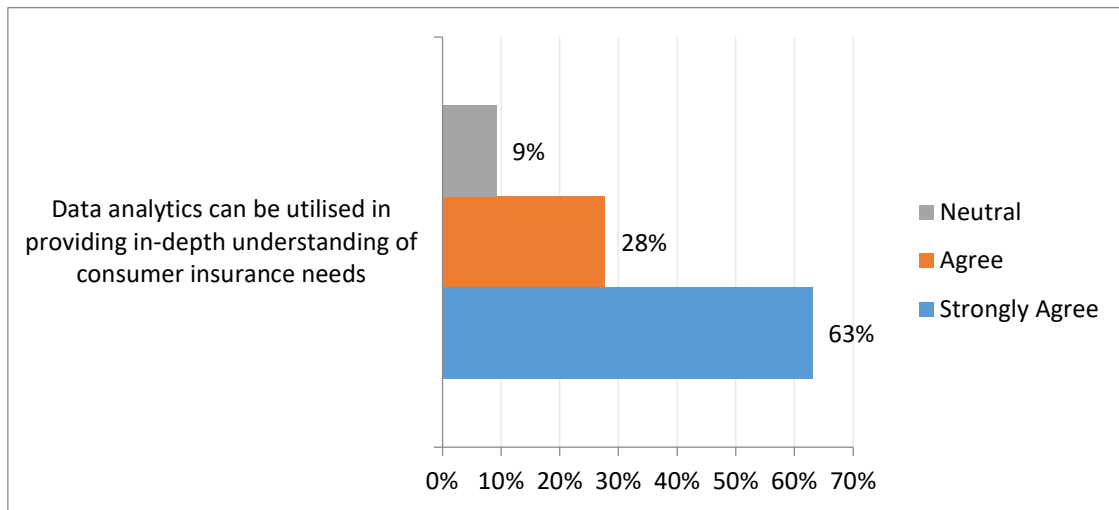


Figure 4-5: Statement A

From Figure 4-5 above, it was observed that most respondents see data and analytics as important and useful in providing a deep understanding of the consumer behaviour, as well as their needs. A combination of 63% that strongly agree and 28% that agree implied that 91% agreed with the statement, while 9% stayed neutral to the statement.

The feedback received indicates that data ought to and to an extent play a central role in understanding customer needs and behaviour within the firm. However, it is important to note that biases and archaic ways of working still prevent many professionals from fully committing to empiricism, thus many employees still want to go with their existing opinion. Sampson (2019) indicated that people are predisposed to going with what they have always known and find it difficult to transition. By transitioning, this refers to moving from what they have always known to relying on data which could likely turn their assumptions into better outcomes. The use of data analytics enables firms to observe changing customer related patterns and trends, such that they are better to maintain their customer base (Kopanakis, 2020).

4.4.2 Statement B and C

The Figure 4-5 below shows how data analytics would provide quality services and how product design process can benefit from the use of data analytics. The Figure 4-5 were in response to the following statements;

- B. If businesses utilised data analytics, they would be able to provide quality services and/or products.
- C. Product design process can benefit from the use of data analytics.

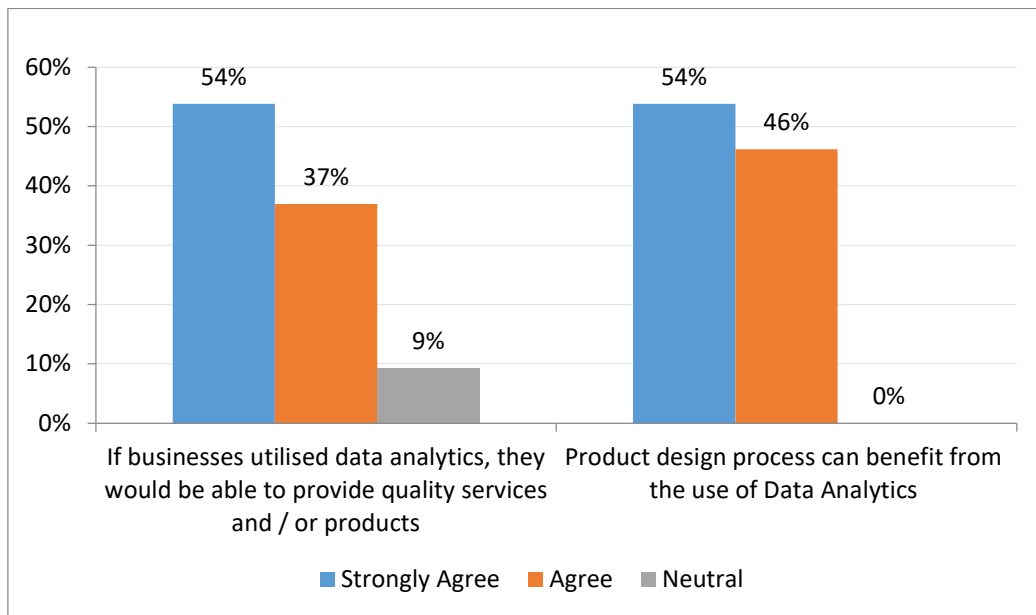


Figure 4-6: Statement B and C

Statement B of the Figure 4-6 above showed that a total of 91% agreed that if business utilised data analytics, they would be able to provide quality services and / or products while 9% remained neutral to the statement. Statement C of Figure 4-6 showed that the entire 100% of the respondents agreed that product design process can benefit from the use of data analytics.

Data analytics assists towards evidence based decision making, which goes a long way in ensuring a holistic and fit for purpose products in the end (Lotame, 2019). These products when completed are usually beneficial to both the firm in terms of revenue generated and the clients in terms of providing them with the services they actually need (Lotame, 2019). As Wuthrich and Buser (2019) indicated, data analytics enables a firm to gain insights which assists in creating value adding

propositions within firms. The feedback from the respondents to Statement B revealed that leveraging on data analytics would enable UHS in providing quality services and products to their customers. Their feedback is well aligned with existing literature, which supports that utilising data analytics enhances the products and services an organisation can offer.

Similarly, data analytics can aid product design process as shown by the respondents' feedback to Statement C. During product design process, the use of data analytics can be used in testing ideas and providing feedback based on assessments (Mehta & Pandit, 2018). Testing being an important aspect of the product design process relies strongly on data analytics in ensuring whether the designed product can go to the market without a glitch (Lewis & Van Horn, 2013). The feedback on the features of the product being tested also requires the agility of data analytics in compiling responses and the way forward (Koestoer et al., 2019). The response of the respondents to Statement C is clearly in line with existing literature.

4.4.3 Statements D, E and F

The Figure 4-7 below provides the feedback of the respondents to Statements D, E and F respectively.

- D. As service providers, we should always put the consumers first.
- E. Consumers are very likely to purchase customised products.
- F. Providers should use data analytics to predict customer behaviour.

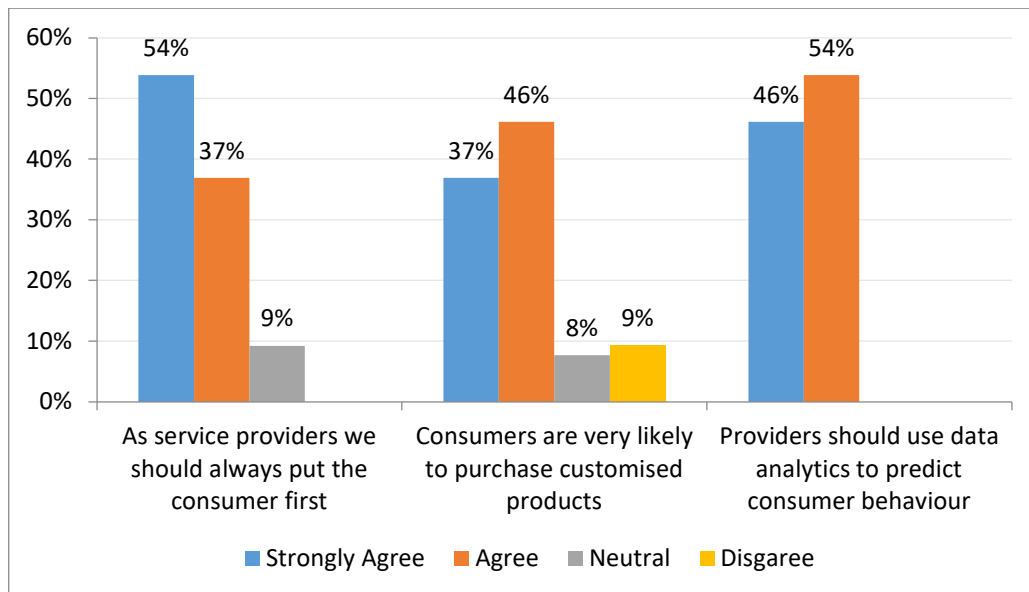


Figure 4-7: Statements D, E and F

Figure 4-7 above reveals the response of the respondents to Statements D, E and F. The respondents' feedback to Statement D showed that 91% agreed that service providers should always put the consumers first while 9% remained neutral. The feedback to Statement E showed that 83% agreed that consumers are very likely to purchase customised products, 8% remained neutral while 9% disagreed with the statement. In addition, 100% of the respondents agreed to Statement F which sought to understand whether providers should use data analytics to predict consumer behaviour.

One of the core aspects of focus during product testing is that the producers must ensure that the product delivers the result according to claims and that consumers can derive the expected corresponding product value (Koestoer et al., 2019). This implies that consumers' satisfaction should be paramount in the mind of the providers with regards to data analytics. A product that will fit well with the consumer has to be affordable to the intended consumers in order to ensure commercial success (Manning et al., 2018). As Bertoni (2018) highlighted, good product must be clear to the consumer as transparency is vital. In the same way, products that are designed for consumers should also be customised for the consumer. In other words, it should be fit for the required purpose and should cover all elements required by the consumer (Manning et al., 2018). It is clear that the feedback of the respondents to Statement D and E are in line with existing literature. In order to

maintain a customer friendly product, providers must pay attention to data analytics such that consumers remains a focal point. In so doing, consumers will be drawn to products that have been customised for them.

Understanding the behavioural patterns of consumers and customers are vital during product design process. Data analytics play an important role as they assist the providers in collating unstructured information in a way that the behavioural patterns of the consumers are carefully assembled (Marques et al., 2017). The literature review highlighted that wearable technologies have increased the amount of data that companies have available to access, in order to understand their customers' habits and behaviour (Nayak et al., 2019). This type of understanding would not have been possible if not for the value that data analytics brings. The response of the respondents to Statement F clearly shows that their views are strongly aligned with existing literatures.

4.4.4 Statements G and H

The Figure 4-8 below shows the feedback of the respondents to Statements G and H respectively.

G. Data analytics team is sufficiently resourced.

H. Product design team is sufficiently resourced.

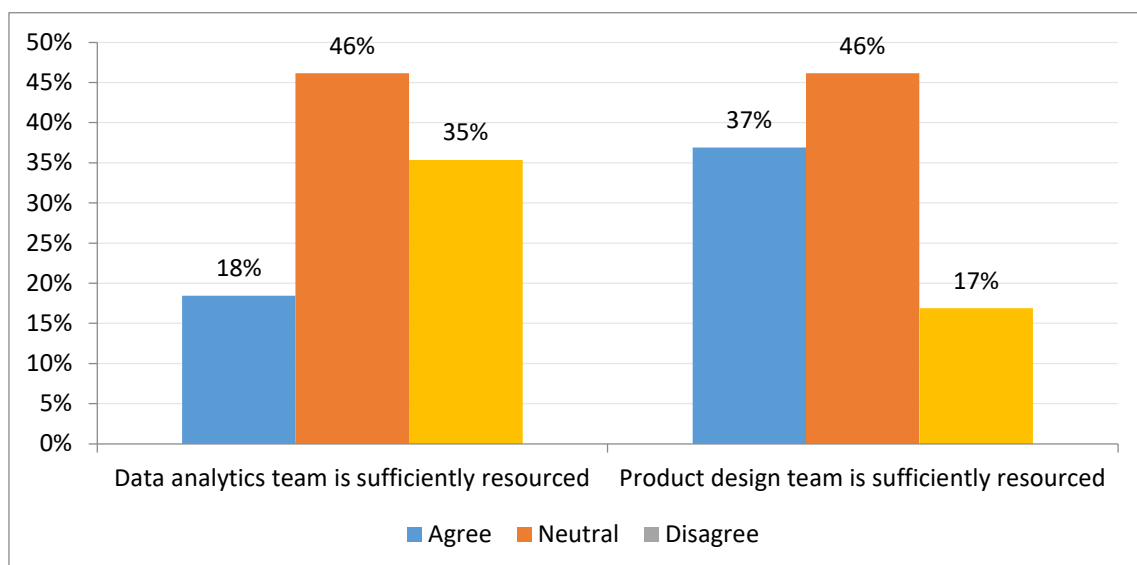


Figure 4-8: Statements G and H

From the Figure 4-8 above, it is clear that 65% of the respondents agreed that data analytics team is sufficiently resourced while 35% disagreed. Also, 83% agreed that product design team is sufficiently resourced while 17% disagreed with the statement.

Data analytics process flow requires that the team be provided with the required resources needed at each stage. For example, adequate resources are provided from the first stage which is the data collection (Ghosh et al. 2017). This is because it is very important to ensure that the data analytics team have exhausted all avenues in collecting valuable data, as it important to have a holistic view of the information in the public (Pickell, 2019). In the same way, product design team are supposed to be adequately funded and resourced as highlighted by Golder and Mitra (2018). The entire process from product ideation to market launch is a long haul. Hence, it is necessary that no stone is left unturned during the product design process by the design team as it relates to funding and resources (Clifton et al., 2019). Appropriate channels are explored prior to the launch of the product, with the aim of ensuring that the consumers receive the adequate message regarding the new product (Unilever, 2019). The feedback of the respondents to Statement G showed that many agree that the data analytics team are properly resourced, even though the proportion that disagreed is quite concerning. This shows that at UHS, some of the participants believe that better funding is needed for data analytics team. However, the feedback of the respondents are in line with existing views. Also, the feedback of the respondents to Statement H are well aligned to current views regarding resourcing for product design team.

4.5 THE CHALLENGES ENCOUNTERED WHEN COLLECTING DATA FOR THE DESIGN OF CUSTOMER FRIENDLY PRODUCTS.

This section sought to understand difficulties and challenges that are encountered when collecting data for the design of customer friendly products. Six statements which the respondents provided feedback on are shown in this section.

4.5.1 Statement I and J

Figure 4-9 below outlines respondents' feedback to Statement I and J.

- I. Firms often collect irrelevant or duplicate data.
- J. Firms misinterpret the data collected from consumers.

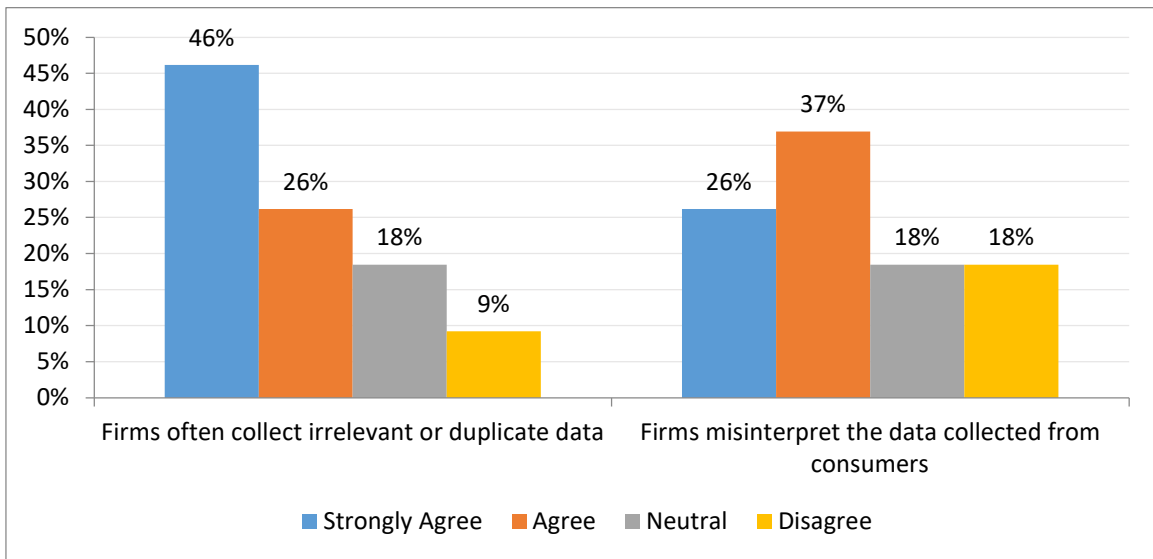


Figure 4-9: Statements I and J

From Figure 4-9 above, 72% agreed that firms often collect irrelevant or duplicate data, 18% were neutral while 9% disagreed with Statement I. Also, 63% of the respondents agreed that firms misinterpret the data collected from consumers, 18% remained neutral while 18% disagreed with Statement J.

The feedback of the respondents to Statement I is in line with literature. As highlighted by Yu and Yang (2016), the nature of data collected should not be irrelevant to the focal area of the customer friendly product design. Irrelevant data implies that such data is not aligned to the purpose of the investigation or research leading up to the product design (Ngai, 2018). As Babich (2017) explained, duplication during product design problem is another challenge which can skew the intended design outcome. There were more respondents that agreed to Statement J even though the proportion that remained neutral and disagreed were quite significant. Nevertheless, it is essential to avoid misinterpretation of data; which implies that data should be straightforward and clear (Gorkovenko et al., 2020). The misinterpretation of data by firms can lead towards a different outcome that is contrary to the intended produce design outcome (Ren et al., 2019). Hence, this should be strongly avoided.

4.5.2 Statement K and L

Figure 4-10 below depicts respondents' feedback to Statement K and L.

K. Consumers are willing to provide data.

L. Consumers trust their insurance providers.

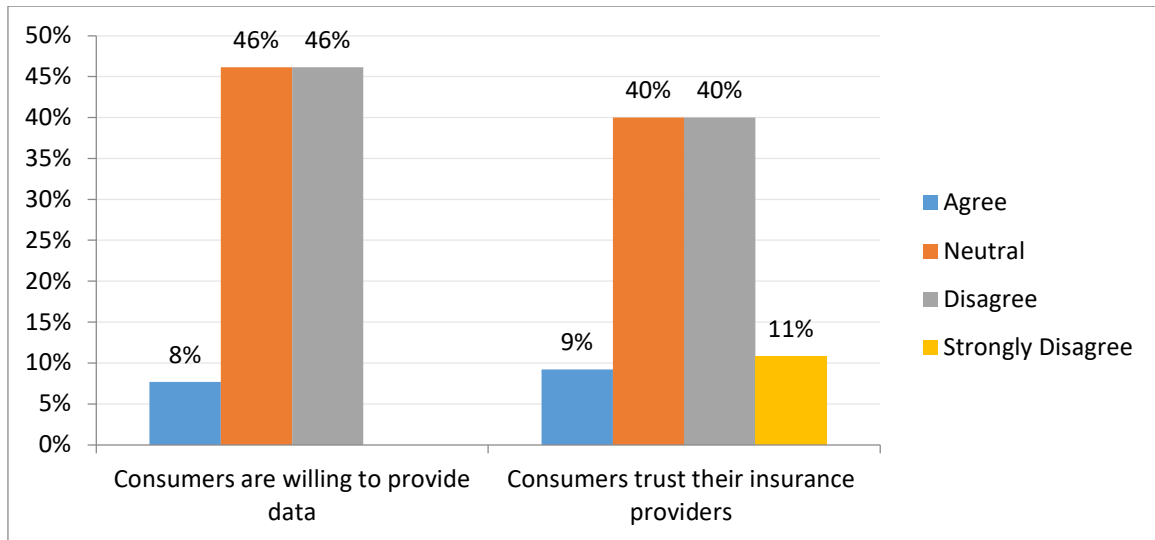


Figure 4-10: Statements K and L

From Figure 4-10 above, only 10% agreed that Statement K, which was that consumers are willing to provide data, 46% remained neutral while 46% disagreed with the statement. For Statement L, 9% agreed that consumers trust their insurance providers, 40% remained neutral while 51% disagreed with the statement.

According to Chummun (2019a), contemporary consumers want to trust their service providers and are willing to share data with them. However, previous security breaches at companies such as Facebook, Sony and Safaricom and their M-PESA platform dent this trust, causing consumers to shy away from sharing such information (Chummun, 2019). Cybersecurity continue to be a very important when data is discussed. As a result, not many consumers are willing to provide data and would naturally protect themselves, which makes it difficult for product designers to collect data for their studies (Agababa, 2017b). As much as consumers benefit from insurance services for which they pay for, the level of comfort in giving away their information for data analytics product design studies still remain a challenge (Nayak

et al., 2019). Therefore, the feedback of the respondents are very well aligned to existing literature views.

4.5.3 Statement M and N

Figure 4-11 below depicts respondents' feedback to Statement M and N.

M. Other departments in my firm are willing to share data with the analytics team.

N. Data analytics team are able to explain the value of their work to the rest of the firm.

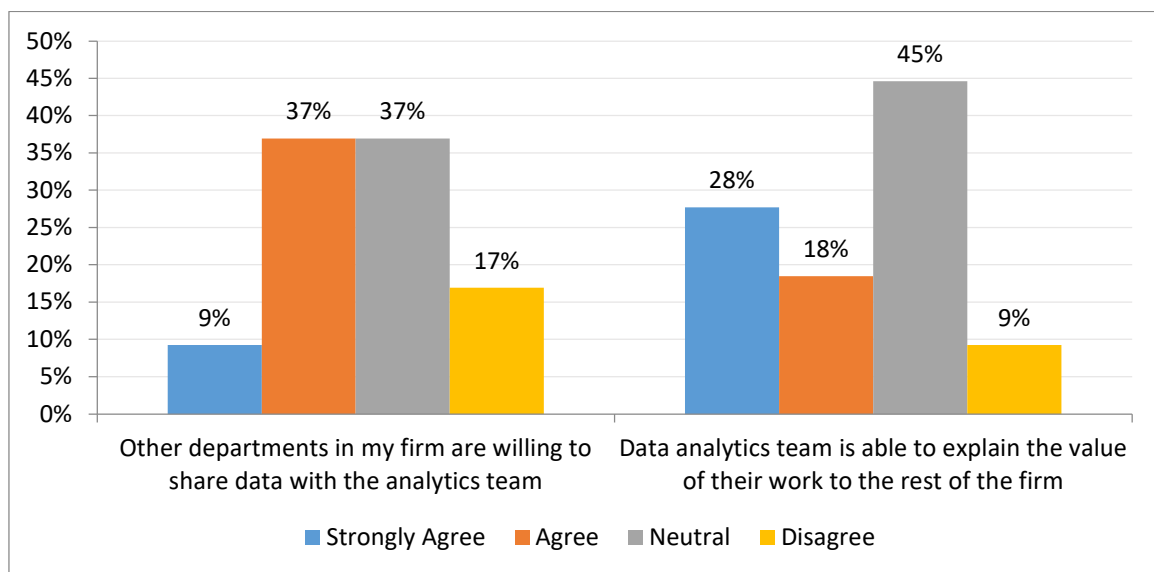


Figure 4-11: Statements M and N

Figure 4-11 above revealed that 46% agreed to Statement M, 37% remained neutral while 17% disagreed that other departments in their firm are willing to share data with the analytics team. 46% agreed that data analytics team are able to explain the value of their work to the rest of the firm, 45% remained neutral while 9% disagreed with Statement N.

One of the core benefits of data analytics is that proper application can revive a falling insurance business (Agababa, 2017a). The insight that data analytics brings to an organisation need to be shared with the entire team, such that the value and benefits it brings to a business can be appreciated (Wuthrich & Buser, 2019). Proper clarity will enable other departments that are beyond data analytics and design team

to actively participate in sharing data when required (Sampson, 2019). In order for this to happen, it is important that such platforms need to be set by organisational management. The integration of the values which data analytics offer to an organisation will enable the formation of synergies between data analytics and product design team (Lohiya et al., 2017). The proportion of participants that agreed to Statement M and N are in line with existing literatures, although this proportion is not very convincing in view of those who remained neutral, as well as those that disagreed.

4.6 MITIGATION FOR CHALLENGES WHEN COLLECTING DATA FOR THE DESIGN OF CUSTOMER FRIENDLY PRODUCTS.

This section sought to understand the mitigations for challenge when collecting data for the design of customer friendly products.

4.6.1 Statement O

Figure 4-12 below outlines respondents' feedback to Statement O.

O. Providers should always allow consumers to complete surveys anonymously.

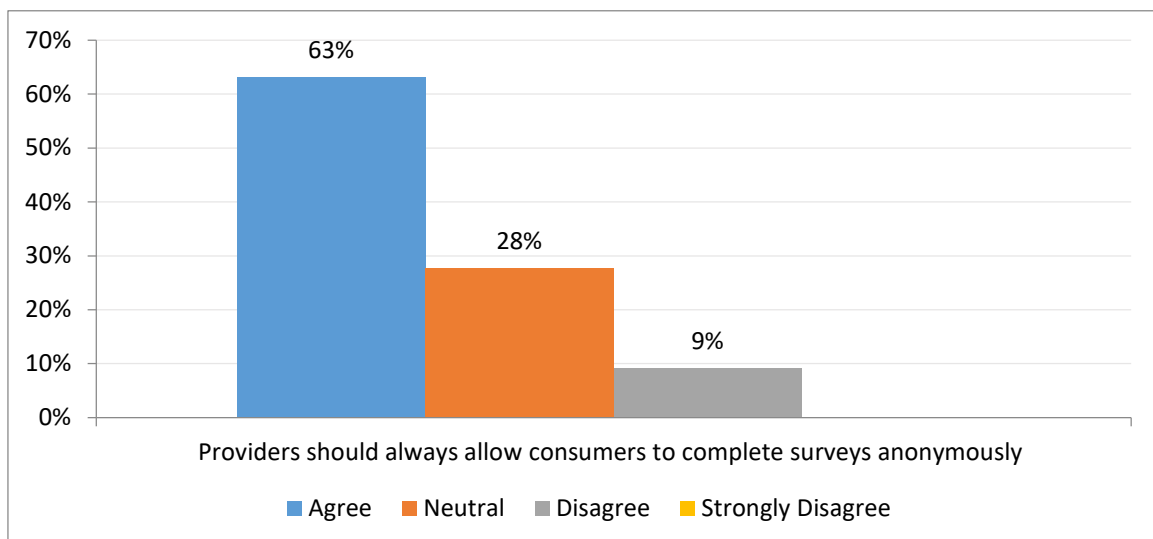


Figure 4-12: Statement O

The Figure 4-12 above showed that 63% agreed that providers should always allow consumers to complete surveys anonymously, 28% remained neutral while 9% disagreed with Statement O.

As previously highlighted by Chummun (2019a), contemporary consumers want to trust their service providers and are willing to share data with them in form of surveys. Consumers prefer their surveys to remain anonymous as their privacy matter greatly to them. In collecting data via the use of surveys from consumers, it is sufficient to make use of demographic information as there is strong resistance from consumers or responders when the level of confidentiality and anonymity is poor (Devadiga, 2017). Proper priority should be put on allowing participants in any type of study to complete such anonymously (Zuiderwijk et al., 2015). The feedback of the respondents are in line with existing literatures and further supports the view that insurance providers should always allow consumers to complete surveys anonymously.

4.6.2 Statement P

Figure 4-13 below outlines respondents' feedback to Statement P.

P. Insurers should ensure that they strike a balance between customisation and complexity.

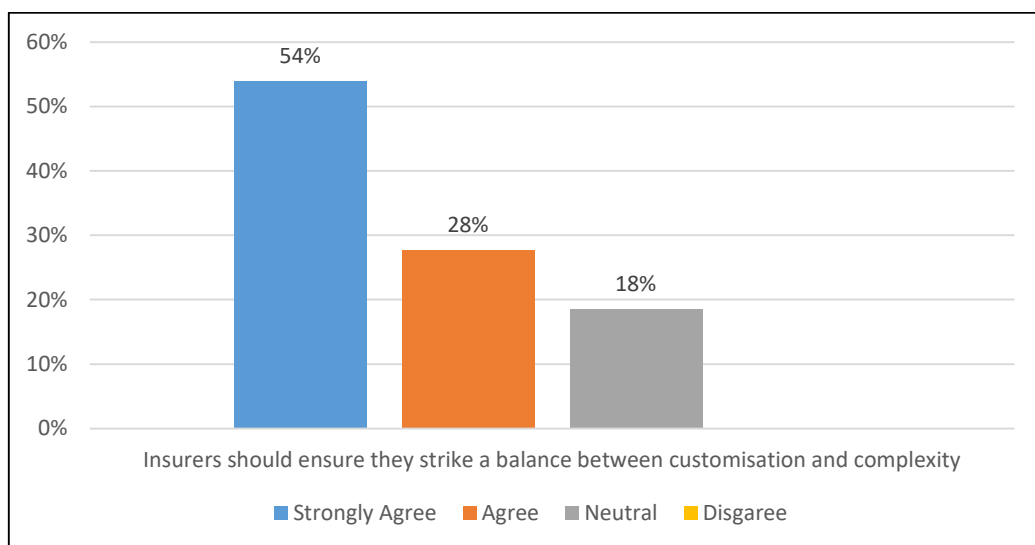


Figure 4-13: Statement P

A closer look at Figure 4-13 above showed that a total of 82% agreed that insurers should ensure that they strike a balance between customisation and complexity, while 18% disagreed with the statement.

Vuong, Ho, Nguyen and Vuong (2018) revealed that consumers should at all-time be rest secure in the knowledge of what their insurance product offers. The absence of such balance with regards to customisation and complexity can create difficulties for consumers, such that they can be put off when their providers do not understand their preference (Vuong et al., 2018). The balance between making products that appeal to a large number of consumers while catering for specific needs is one that the many professionals in this field lose sleep over (Tao et al., 2019). While data can bring some clarity in terms of what most of your consumers and potential consumers want and are likely to purchase, it can also lead to information overload. It can also lead to analysis paralysis, where the information because of its sheer size, actually becomes an impediment to productivity (Tao et al., 2019). Ultimately, it is vital for the producer to find the balance between complexity and customisation. The direction of response showed that respondents believes providers should strike a balance between both.

4.6.3 Statement Q, R and S

Figure 4-14 below depicts respondents' feedback to Statement Q, R and S.

- Q. It is easy to quantify impact of analytics on revenue.
- R. Product design teams understand how their performance is measured.
- S. Data analytics team understand how their performance is measured.

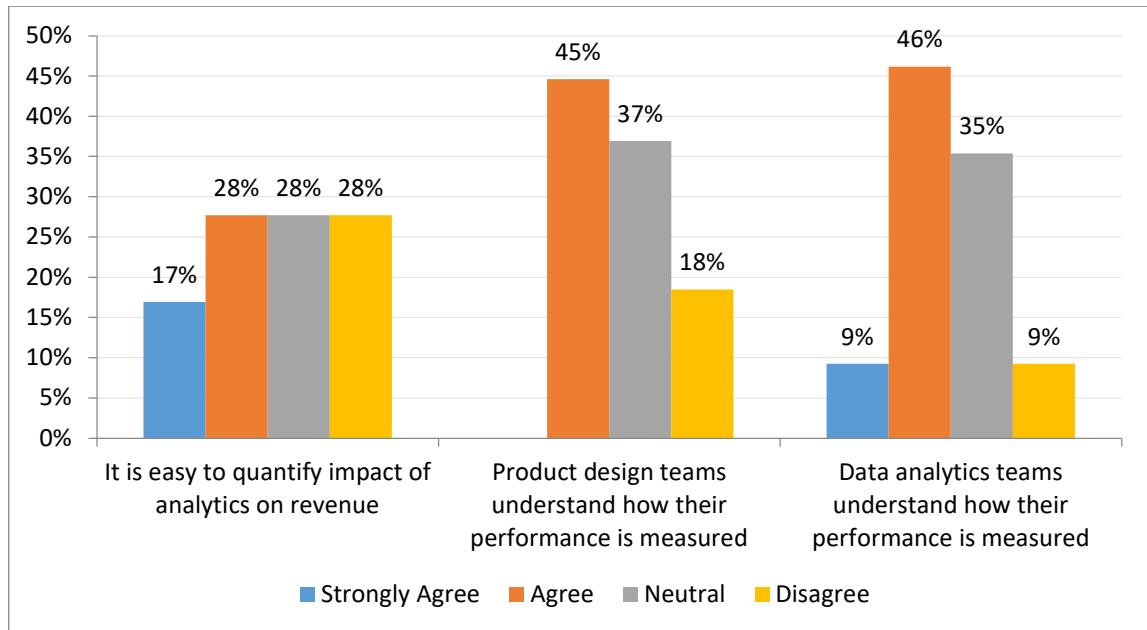


Figure 4-14: Statements Q, R and S

From the feedback to Statement Q as presented in Figure 4-14 above, 45% agreed that it is easy to quantify impact of analytics on revenue, 28% was neutral while 28% disagreed with the statement. In reference to Statement R, 45% agreed that product design teams understand how their performance is measured, 37% remained neutral while 18% disagreed. Also, 55% agreed that data analytics team understand how their performance is measured, 35% remained neutral while 9% disagreed.

Impact of analytics on revenue affects many part of a business such as service level performance, improved supplier management, maximising customer value and driving cost down (Tredgold, 2017). Data analytics are utilised by many top leaders and managers in making sound decision for their organisations, such that they rely on the trends from data analytics to lead adequately (Kumar, 2019). In so doing, it is very straightforward to quantify the benefits that analytics could have on business revenue. The feedback of the respondents with regards to those that agreed was not very convincing, unlike literature review. This could mean that the quantification of data analytics impact on revenue is not very solid within UHS.

Product design and data analytics team success are related to the outcome of their project purpose (Nayak et al., 2019). For instance, the performance of project design

team is directly related to the market response of the consumers besides fulfilling their in house mandate. Nevertheless, it is important to have the performance metrics for the project design and data analytics team set out from the onset. In so doing, there is more clarity on what the project design and data analytics team should expect.

4.7 SUMMARY OF DATA FINDINGS

This section provides a concise outline of the findings from the primary data above. This first paragraph below summarises the feedback from the primary data, with focus on the importance of data analytics in the design of customer friendly products. As a start, the participants were in strong agreement towards statement A; the outcome was that data and analytics were seen as vital in comprehending and revealing consumer behaviours. There was also a strong agreement towards statements B and C by the participants. The findings revealed that the use of business analytics would improve the quality of services and productions. In addition, it was also seen that product design protocols can be improved upon via the use of data analytics. A strong level of agreement was also observed towards the respondents' feedback to Statement D, E and F. In essence, service providers should put the consumers first, consumers are likely to buy customised products, and that providers should put effort in using data analytics to predict the behaviour of customers. Finally under this section, looking at Statement G, the feedback from the primary data showed that analytics team were not strongly resourced and equipped. However, the respondents to Statement H showed that product design team were adequately resourced.

This paragraph summarises the outcome of the primary data with regards to the challenges encountered when gathering data for the design of customer friendly products. The response to Statements I and J showed that irrelevant or duplicate data are often collected, and that companies do misinterpret data collected from consumers. Another challenge observed was outlined by Statements K and L. The data findings showed that there is unwillingness on the side of consumers to provide data and that consumers do not really trust their insurance providers. The primary

data also showed that other business units or departments are not very willing to share data with the analytics team according to Statement M.

This last paragraph outlines some of the mitigation in dealing with challenges that arise when collecting data for the design of customer friendly products. A strong solution as highlighted by response to Statement O, was that providers should always allow customers to complete surveys anonymously. According to Statement P, it was also revealed that the respondents agree that insurers should ensure that they maintain a balance between product customisation and complexity.

4.8 SUMMARY

This chapter presented the results from the primary data, findings and discussion of the findings. The outcome of the demographics as it concerns the study was discussed and noteworthy points were highlighted. This chapter also reviewed the findings under each of the objectives and the alignment or deviation from literature review was presented. The next chapter, which is the final chapter presents the conclusions and recommendations from the study.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

The foregoing chapter outlined the study results, observations and findings from the result. This chapter presents the study outcomes and recaps from the primary data that are outlined under each objectives. The conclusions and recommendations of this study are presented in this chapter, in a bid to respond to the study objectives and research questions. The study limitations and scope for further studies was also presented in this chapter.

5.2 RECAP OF RESEARCH QUESTIONS AND OBJECTIVES

This study was directed by the following objectives;

1. To establish the role and importance of data analytics in the design of customer friendly products at Universal Healthcare Services.
2. To assess the challenges that Universal Healthcare Services faces when collecting data for product design.
3. To identify recommendations on the extent that these challenges can be mitigated.

The research questions of the study are as follows;

1. What is the role and importance of data analytics in the design of customer friendly products at Universal Healthcare Services?
2. What are the challenges that Universal Healthcare Services encounter when collecting data for the design of customer friendly products?
3. What can be done to mitigate those challenges when collecting data for the design of customer friendly products?

5.3 OUTCOMES AND SUMMARIES FROM LITERATURE REVIEW AND PRIMARY DATA

The findings from the primary data are presented under each of the objectives below.

Objective 1:

To establish role and importance of data analytics in the design of customer friendly products

The feedback from the primary data as highlighted by Figure 4-5 revealed that play a vital role in understanding the needs of the customer and their behaviour within in a firm. As a result, data analytics can be used to provide in-depth understanding of consumers' insurance needs. The findings from Figure 4-6 showed that data analytics assists businesses in providing quality and better services or products. It is clearly safe to say that this study affirmed that service providers such as UHS should always put the consumers first in line with response from Figure 4-7. The findings from primary data based on Figure 4-7 also showed that data analytics helps in predicting consumers and customer behaviours. Figure 4-8 also showed that adequate resources should be provided for the data analytics and the product design team within UHS.

Objective 2:

To assess the challenges that UHS faces when collecting data for product design

The findings according to Figure 4-9 agreed that one of the main challenges for product design in UHS is the collection of irrelevant data. In addition, the primary data also agreed that a good number of firms misinterpret the data collected from consumers. From Figure 4-10, it was revealed that not many consumers are willing to share their data and would prefer to protect themselves, which makes it hard for product designers to collect study data. This unwillingness is a major challenge to data collection. The findings from the primary data as depicted by Figure 4-11 showed that other departments are willing to share data with the analytics team, which was not a dominating view among the entire respondents. In addition, data analytics team are not able to strongly explain the value of their work to the rest of the firm.

Objective 3:

To identify recommendations on the extent these challenges can be mitigated

The findings from the primary data as depicted by Figure 4-12 showed that one of the recommendations on mitigating challenges around data analytics is to allow consumers to complete surveys anonymously. In terms of data assessment, Figure 4-13 showed that majority of the respondents agreed that insurers should ensure there is a balance between product customisation and complexity. The findings from the primary data as shown by Figure 4-14 revealed that it is easy to quantify impact of data analytics on revenue. Finally, the findings from the primary data as depicted in Figure 4-14 showed that product design and data analytics team understand how their performances are measured.

5.4 STUDY CONCLUSIONS

The following conclusions below are drawn from this study. They are;

- Data play a vital role in understanding the needs of the UHS customer and their behaviour within a firm. As a result, it can strongly be concluded from this study that data analytics helps in predicting consumers and customer behaviours
- It can be concluded from this study that data analytics assist businesses in providing quality and better services or products. In addition, product design process within UHS can benefit from the use of data analytics.
- This study clearly shows that service providers such as UHS should always maintain their customers as their priority.
- This study shows that adequate resources should be provided for the data analytics and the product design team within UHS.
- A major challenge for product design within UHS is the collection of irrelevant data. Additionally, this study showed that a good number of firms misinterpret the data collected from consumers.
- The unwillingness of consumers to provide their data or trust their insurance providers such as UHS, is a major challenge to data collection.

- This study showed that not many departments within UHS were willing to share data with the analytics team. Also, it was uncovered that the value of data analytics work is not well understood by the entire UHS organisation.

5.5 STUDY RECOMMENDATIONS

The recommendations from this study include;

5.5.1 Use of Surveys to Mitigate Challenges

It was uncovered from this study that many consumers are unwilling to participate in valuable studies, because of privacy concerns. As a result, the challenges around data analytics studies can be mitigated by allowing consumers and customers to complete surveys anonymously.

5.5.2 Balance between Customisation and Complexity

Organisations such as UHS should ensure that there is balance between product customisation and any form of complexity. In essence, product customisation should be clear enough with limited ambiguity.

5.5.3 Use of Data Analytics in Improving Business Revenue

This study showed the value of data analytics in improving business revenues. As a result, it is recommended that data analytics should be used by UHS as it assists in improving business revenue.

5.5.4 Avoiding Irrelevant Data and Misinterpretation

Efforts should be put by UHS to ensure that data for product design and improvement are not irrelevant data and that misinterpretation of data should be avoided at all cost.

5.5.5 Role of Data Analytics Awareness

Business leaders and senior managers within UHS should create more awareness on role of data analytics and their workforce. The awareness should be aimed at ensuring that data analytics role is fully embraced by the entire organisation.

5.6 LIMITATION OF THE STUDY

The limitations of the study are as follows;

- This study centered solely on data analytics on insurance products. This study was restricted to UHS and did not extend to other forms of healthcare.
- This study also focused only on the team that are based in Gauteng and did not consider other provinces. Hence, the outcome of this study should not be applied to other industries.

5.7 SCOPE FOR FURTHER STUDY

Some of the recommendations for future studies direction includes;

- Exploring the direct impact of data analytics on other insurance companies.
- The relationship of data analytics and how it affects business performance at UHS.
- Assessment of how data analytics affect company revenues on a short and long term basis.

5.8 CONCLUSION

This chapter reviewed how this study dealt with the objectives upon which this study was carried out. Data analytics remains a crucial aspect of the present day business environment and is instrumental to the stabilisation as well as the growth of any organisation. This study reviewed the role and importance of data analytics in the design of customer products. The challenges that firms such as UHS face when collecting data for product design was also assessed. This study then identified some recommendations on the extent these challenges can be addressed. The findings based on the summaries from the literature review were highlighted and the outcomes from the primary data assessment were outlined. This chapter further presented the conclusions and recommendations from this study. The researcher considers this study to be valuable and that potential room exist for future studies.

REFERENCES

Agababa, R., 2017a. *The Benefits of Data Analytics for Insurance Businesses*. [Online] Available at: <https://dataflog.com/read/benefits-data-analytics-insurance-business/3670> [Accessed 2 August 2020].

Agababa, R., 2017b. *Five Ways Data Analytics is Transforming the Insurance Industry*. [Online] Available at: <https://www.dataversity.net/five-ways-data-analytics-transforming-insurance-industry/#> [Accessed 9 August 2020].

Amadeo, K., 2020. What is Competitive Advantage - Definitions and Examples of Competitive Advantage? [Online] Available at: <https://www.thebalance.com/what-is-competitive-advantage-3-strategies-that-work-3305828> [Accessed February 18 2021].

Babich, N., 2017. *The Importance of Data in Design*. [Online] Available at: <https://blog.adobe.com/en/2017/05/10/the-importance-of-data-in-design.html#gs.e8bb4e> [Accessed 11 August 2020].

Babich, N., 2018. *A Comprehensive Guide to Product Design*. [Online] Available at: <https://www.smashingmagazine.com/2018/01/comprehensive-guide-product-design/> [Accessed 6 August 2020].

Barends, E., Rousseau, D. M. & Briner, R. B., 2014. *The Basic Principles*, Amsterdam: Center for Evidence-Based Management.

Berg, L. P. & Vance, J. M., 2017. Industry use of virtual reality in product design and manufacturing: a survey. *Virtual Reality*, 21(1), pp. 1-17.

Bernerth, J. B., Cole, M. S., Taylor, E. C. & Walker, J., 2018. Control Variables in Leadership Research: A Qualitative and Quantitative Review. *Journal of Management*, 44(1).

Bertoni, A., 2018. Role and Challenges of Data-Driven Design in the Product Innovation Process. *16th IFAC Symposium on Information Control Problems in Manufacturing*, 11-13 June, pp. 1-6.

Bhat, A., 2018. *Research Design: Definition, Characteristics and Types*. [Online] Available at: <https://www.questionpro.com/blog/research-design/> [Accessed 3 April 2019].

Blanken, E., 2017. *The Impact of Big Data and Machine Learning on Insurance*, Amsterdam: University of Amsterdam.

Borowska-Beszta, B., 2017. Decoding of Bias in Qualitative Research in Disability Cultures: A Review and Methodological Analysis. *International Journal of Psycho-Educational Sciences*, 6(3), pp. 55-68.

Chummun, B. Z., 2019. The Evolution of Microfinance Products to Promote Microentrepreneurship Towards Social Progress of African Countries. In: *Strategic Marketing for Social Enterprises in Developing Nations*. s.l.:IGI Global, pp. 292-315.

Chummun, B. Z. & Bisschoff, C. A., 2014. Investigating the Marketing of Microinsurance Products in South Africa. *Journal of Economics*, 5(1), pp. 57-65.

Clayton, J., 2019. The five Stages of the Strategic Management Process [Online] Available at: <https://smallbusiness.chron.com/five-stages-strategic-management-process-18785.html> [Accessed 20 February 2021].

Clifton, M. B., Townsend, W. P., Bird, H. M. & Albano, R. E., 2019. *Target Costing: Market Driven Product Design*. s.l.:CRC Press.

Cooper, D. & Schindler, P. S., 2011. *Business Research Methods*. 11th ed. Melbourne: McGraw-Hills.

Creswell, J. W. & Creswell, D. J., 2018. *Research Design: Qualitative, Quantitative and Mixed Method Approaches*. 5th ed. Los Angeles: SAGE.

Devadiga, N. M., 2017. Tailoring Architecture Friendly Design Method with Rapid Prototyping. *2nd International Conference on Communications and Electronics Systems (ICCES)*, 8 May, pp. 924-930.

Drost, E. A., 2011. Validity and Reliability in Social Science Research. *Education Research and Perspective*, 38(1), pp. 100-115.

Duggan, J., 2019. *Business Impact of Big Data: Top 5 Things You Need to Know*. [Online] Available at: <https://www.cognetik.com/blog/business-impact-of-big-data-top-5-things-you-need-to-know/> [Accessed 25 August 2020].

Econex, 2015. *The South African Private Healthcare Sector: Role and Contribution to the Economy*, Johannesburg: s.n.

Frankenfield, J., 2020. *Data Analytics*. [Online] Available at: <https://www.investopedia.com/terms/d/data-analytics.asp> [Accessed 5 August 2020].

Freedman, M., 2020. *How Businesses are collecting data (and what they're doing with it)*. [Online] Available at: <https://www.businessnewsdaily.com/10625-businesses-collecting-data.html> [Accessed 28 September 2020].

Gandomi, A. & Haider, M., 2015. Beyond the Hype: Big Data Concepts, Methods, and Analytics. *International Journal of Information Management*, 35(2), pp. 137-144.

Ghosh, D. et al., 2017. Cyber-Empathic Design: A Data Driven Framework for Product Design. *Journal of Mechanical Design*, 139(9), pp. 90-130.

Gilliland, N., 2019. *Five examples of customer-friendly companies*. [Online] Available at: <https://econsultancy.com/examples-customer-friendly-companies/> [Accessed 2 August 2020].

Golder, P. N. & Mitra, D., 2018. New product development research: consolidating the present and guiding the future. In: *Handbook of Research on New Product Development*. s.l.:Edward Elgar Publishing, pp. 3-10.

Gorkovenko, K. et al., 2020. *Exploring the future of data-driven product design*. Honolulu, CHI.

Hayes, A., 2020. *Wearable Technology*. [Online] Available at: <https://www.investopedia.com/terms/w/wearable-technology.asp> [Accessed 16 August 2020].

Hough, J., Thompson, A.A., Strickland, A.J., & Gamble, J. E., 2011. *Crafting and Executing Strategy - Creating Sustainable High Performance in South African Businesses*. McGraw-Hill Higher Education, 2nd Ed.

Kenton, W., 2020. *Strategic Management*. [Online] Available at: <https://www.investopedia.com/terms/s/strategic-management.asp> [Accessed 6 August 2020].

Kivunja, C. & Kuyini, A. B., 2017. Understanding and Applying Research Paradigms in Educational Contexts. *International Journal of Higher Education*, 6(5), pp. 26-41.

Koestoer, R. A., Roihan, I. & Andrianto, A. D., 2019. Product design, prototyping, and testing of twin incubator based on the concept of grasshof incubator. *AIP Conference Proceeding*, 5 January.

Kopanakis, J., 2020. *5 Real-World Examples of How Brands are Using Big Data Analytics*. [Online] Available at: <https://www.mentionlytics.com/blog/5-real-world-examples-of-how-brands-are-using-big-data-analytics/> [Accessed 6 August 2020].

Krishnamurthy, M., Marcinek, P., Malik, K. M. & Afzam, M., 2018. Representing social network patient data as evidence-based knowledge to support decision making in disease progression for comorbidities. *IEEE Access*, Volume 6, pp. 12951-12965.

Kumar, V., 2019. *How Data Science Helps to Grow Revenue to your Business*. [Online] Available at: <https://towardsdatascience.com/how-data-science-helps-to-grow-revenue-to-your-business-4f4b36956cb4> [Accessed 24 August 2020].

Lewis, K. & Van Horn, D., 2013. Design Analytics in Consumer Product Design: A Simulated Study. *ASME 2013 International Design Engineering Technical Conference & Computers and Information in Engineering Conference*, 4 August, pp. 1-14.

Lohiya, A. S., Gojare, D. M., Karde, S. M. & Patil, A. A., 2017. Optimise ETL for Banking DDS: Data Refining using ETL Process for Banking Detail Data Store

(DDS). *Imperial Journal of Interdisciplinary Research (IJIR)*, Volume 3, pp. 1839-1844.

Lotame, 2019. *What is Data Analytics?* [Online] Available at: <https://www.lotame.com/what-is-data-analytics/> [Accessed 14 August 2020].

Lo, G., 2020. What is Product Design and the Product Design Process? [Online] Available at: <https://uxplanet.org/what-is-product-design-and-the-product-design-process-41b41a5bf795> [Accessed 23 February 2021].

Manning, S., Massini, S., Peters, C. & Lewin, A. Y., 2018. The Changing Rationale for Governance Choices: Early vs Late Adopters of Global Services Sourcing. *Journal of Strategic Management*, 39(8), pp. 2303-2334.

Marques, B., Tadeu, A., De Brito, J. & Almeida, J., 2017. A Perspective on the Development of Sustainable Construction Products: an eco-design Approach. *International Journal of Sustainable Development and Pricing*, 12(2), pp. 304-314.

McCombes, S., 2020. *Descriptive research.* [Online] Available at: <https://www.scribbr.com/methodology/descriptive-research/> [Accessed 24 April 2020].

Mehta, N. & Pandit, A., 2018. Concurrence of Big Data Analytics and Healthcare: a Systematic Review. *International Journal of Medical Informatics*, Volume 114, pp. 57-65.

Murray, E., 2019. *What is the Difference between Data Analysis and Data Visualisation?* [Online] Available at: <https://www.forbes.com/sites/evamurray/2019/03/29/what-is-the-difference-between-data-analysis-and-data-visualization/#3a5ae1ab6411> [Accessed 8 August 2020].

Narayanan, S., 2016. *Making Your Product Launch Customer-Friendly.* [Online] Available at: <https://www.zaius.com/learn/making-your-product-launch-customer-friendly/> [Accessed 13 August 2020].

Nayak, B., Bhattacharyya, S. S. & Krishnamoorthy, B., 2019. Integrating wearable technology products and big data analytics in business strategy: A study of health insurance firms. *Journal of Systems and Information Technology*, 21(2), pp. 255-275.

Ngai, J., 2018. *Designing with Data*. [Online] Available at: <https://uxdesign.cc/designing-with-data-ed721ffa008e> [Accessed 19 August 2020].

Nieberding, C., 2019. *The Data Product Design Thinking Process*. [Online] Available at: <https://towardsdatascience.com/the-data-product-design-thinking-process-6b3eba561b2b> [Accessed 2 August 2020].

Olavsrud, T., 2021. What is Data Analytics? Analysing and Managing Data for Decisions [Online] Available at: <https://www.cio.com/article/3606151/what-is-data-analytics-analyzing-and-managing-data-for-decisions> [Accessed 22 February 2021].

Pickell, D., 2019. *5 Steps of the Data Analysis Process*. [Online] Available at: <https://learn.g2.com/data-analysis-process> [Accessed 16 August 2020].

PWC, 2016. *Insurance through Challenging Times: Insurance Industry Analysis*, Johannesburg: PriceWaterhouseCoopers.

Rapley, E., 2018. 'Seeing the Light' Personal epiphanies and moving towards interpretivism; a researcher's tale of exploring teacher pedagogic practice. *Ethnography and Education*, 13(2), pp. 185-203.

Ren, S. et al., 2019. A comprehensive review of big data analytics through product lifecycle to support sustainable smart manufacturing: A framework, challenges and future research directions. *Journal of Cleaner Production*, 210(1), pp. 1343-1365.

Sajid, A., 2019. *Ultimate Product Launch Marketing Plan for Startups*. [Online] Available at: <https://www.cloudways.com/blog/product-launch-marketing-plan/> [Accessed 14 August 2020].

- Sampson, T. D., 2019. Transitions in human-computer interaction: from data embodiment to experience capitalism. *AI & Society*, 34(4), pp. 835-845.
- Sanjari, M. et al., 2014. Ethical challenges of researchers in qualitative studies: the necessity to develop specific guideline. *Journal of Medical Ethics and History of Medicine*, 7(14).
- Saunders, M., Lewis, P. & Thornhill, A., 2016. *Research Methods for Business Students*. 6th Edition ed. s.l.:Pearson Education Limited.
- Sekaran, U. & Bougie, R., 2013. *Research Methods for Business: A Skill-Building Approach*. Chichester, West Sussex: John Wiley & Sons Ltd.
- Senousy, Y. M. B., Ghitany, N. E. M. & Riad, A. E. M., 2018. Recent Trends in Big Data Analytics Towards More Enhanced Insurance Business Models. *International Journal of Computer Science and Information Security*, 16(12), pp. 39-45.
- Smith, J. & Noble, H., 2014. Bias in Research. *Journal of Evidence Based Nursing*, 17(4), pp. 100-101.
- Smyth, D., 2019. *What are the Benefits of Product Design in a Global Market*. [Online] Available at: <https://bizfluent.com/info-8025780-benefits-product-design-global-market.html> [Accessed 3 August 2020].
- Surbhi, S., 2018. *Difference Between Qualitative and Quantitative Research*. [Online] Available at: <https://keydifferences.com/difference-between-qualitative-and-quantitative-research.html> [Accessed 15 July 2019].
- Tao, F. et al., 2019. Digital twin-driven product design framework. *International Journal of Production Research*, 57(12), pp. 3935-3953.
- Tucci, L., & Roy, M., 2019. Strategic Management [Online] Available at: <https://searchcio.techtarget.com/definition/strategic-management> [Accessed February 20 2021].
- Tredgold, G., 2017. *7 Ways Data Analytics Can Boost Your Business Growth*. [Online] Available at: <https://www.inc.com/gordon-tredgold/7-ways-data-analytics-can-boost-your-business-growth.html> [Accessed 26 August 2020].

Twin, A., 2020. *Competitive Advantage*. [Online] Available at: https://www.investopedia.com/terms/c/competitive_advantage.asp [Accessed 7 August 2020].

Unilever, 2019. *Innovation in Unilever*. [Online] Available at: <https://www.unilever.com/about/innovation/innovation-in-unilever/> [Accessed 28 October 2019].

Vuong, Q. H., Ho, T. M., Nguyen, H. K. & Vuong, T. T., 2018. Healthcare consumers' sensitivity to costs: A reflection on behavioural economics from an emerging market. *Palgrave Communications*, 4(1), pp. 70-76.

Wuthrich, M. V. & Buser, C., 2019. Data analytics for non-life insurance pricing. *Swiss Finance Institute Research Paper*, pp. 16-68.

Yu, S. & Yang, D., 2016. The Role of Big Data Analysis in New Product Development. *2016 International Conference on Network and Information Systems for Computers (ICNISC)*, pp. 279-283.

Zuiderwijk, A., Janssen, M., Poulis, K. & Van de Kaa, G., 2015. Open data for competitive advantage: insights from open data use by companies. *Proceedings of the 16th Annual International Conference on Digital Governance Research*, 5 May, pp. 79-88.

APPENDIX A Gate Keeper's Letter



Universal Healthcare (Pty) Ltd
Universal House, 15 Tambach Road, Sunninghill Park, Sandton 2191
PO Box 1411, Rivonia 2128
Tel: 011 208 1000 Fax: +27 11 208 1128 www.universa.co.za

Pitso Chaka
University of Kwa-Zulu Natal
Durban-Westville
3629
e-mail: 218024170@stu.ukzn.ac.za

RESEARCH AREA AND CONTENT

25 July 2019

Dear Pitso,

This letter hereby authorises you to conduct the required research to inform and support your study into the role of Business Analytics in the design and development of health insurance products.



Daniel Liebenberg

APPENDIX B Cover Letter



Date: 06/09/2019

Greetings,

My name is Pitso Chaka from University of Kwa-Zulu Natal, Graduate School of business Science, email address: 218024170@stu.ukzn.ac.za

You are being invited to consider participating in a study about data analytics within insurance industry. The aim and purpose of this research is to ascertain how the use of data analytics can benefit product design within the insurance industry.

This study has been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee (approval number: HSSREC/00000061/2019). In the event of any problems or concerns/questions you may contact the researcher at 218024170@stu.ukzn.ac.za or the UKZN Humanities & Social Sciences Research Ethics Committee, contact details as follows:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION

Research Office, Westville Campus

Govan Mbeki Building

Private Bag X 54001

Durban

4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604557- Fax: 27 31 2604609

Email: HSSREC@ukzn.ac.za

APPENDIX C Informed Consent



INFORMED CONSENT

I _____ (Name Optional) have been informed about the study entitled “Data analytics on customer friendly insurance products at UHS in Johannesburg” by Pitso Chaka.

I understand the purpose and procedures of the study for Masters of Business Administration. I have been given an opportunity to answer questions about the study and have had answers to my satisfaction. I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any of the benefits that I usually am entitled to.

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION

Research Office, Westville Campus

Govan Mbeki Building

Private Bag X 54001

Durban

4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604557 - Fax: 27 31 2604609

Email: HSSREC@ukzn.ac.za

Additional consent, where applicable

I hereby provide consent to:

Signature of Participant

Date

(Signature not necessary if electronic completion)

APPENDIX D Questionnaire

Please indicate your seniority below with a tick:

Intern	
Administrative	
Supervisor	
Manager	
Senior Manager	
Executive	

Please indicate your department with a tick:

Data Analytics	
Product Design	
IT	
Marketing	
Other	

Please indicate your level of education:

Matric	
National Diploma	

Bachelor's Degree	
Honours Degree	
Master's Degree	
Doctoral Degree	

Please indicate number of years working in your field:

Less than 1	
1 to 2	
3 to 6	
7 to 10	
More than 10	

Kindly use the following five-point scale ranging from 1= “totally disagree” to 5= “totally agree” to indicate your level of agreement to the following statements.

1. The role or importance of data analytics in the design of customer friendly products

	1	2	3	4	5
Data analytics can be utilised in providing in-depth understanding of consumer insurance needs					
If businesses utilised data analytics, they would be able to provide quality services and/or products					
Product design process can benefit from the use of Data Analytics					
As service providers we should always put the consumer first					
Consumers are very likely to purchase customised products					
Providers should use data analytics to predict consumer behaviour					
Data analytics team is sufficiently resourced					
Product design team is sufficiently resourced					

2. The challenges encountered when collecting data for the design of customer friendly products

	1	2	3	4	5
Firms often collect irrelevant or duplicate data					

Firms misinterpret the data collected from consumers					
Consumers are willing to provide data					
Consumers trust their insurance providers					
Other departments in my firm are willing to share data with the analytics team					
Data analytics team is able to explain the value of their work to the rest of the firm					

3. Mitigation for challenges when collecting data for the design of customer friendly products

	1	2	3	4	5
Providers should always allow consumers to complete surveys anonymously					
Insurers should ensure they strike a balance between customisation and complexity					
It is easy to quantify impact of analytics on revenue					
Product design teams understand how their performance is measured					
Data analytics teams understand how their performance is measured					

APPENDIX E Turnitin Report

Dissertation

ORIGINALITY REPORT

4%

SIMILARITY INDEX

4%

INTERNET SOURCES

1%

PUBLICATIONS

0%

STUDENT PAPERS

PRIMARY SOURCES

1	Alessandro Bertoni. "Role and Challenges of Data-Driven Design in the Product Innovation Process", IFAC-PapersOnLine, 2018 Publication	1%
2	researchspace.ukzn.ac.za Internet Source	<1%
3	hdl.handle.net Internet Source	<1%
4	docplayer.net Internet Source	<1%
5	psasir.upm.edu.my Internet Source	<1%
6	repository.nwu.ac.za Internet Source	<1%
7	arro.anglia.ac.uk Internet Source	<1%
8	www.forbes.com Internet Source	<1%

APPENDIX F
Editorial Certificate



Editorial Certificate

Manuscript Title

**Data Analytics on Customer Friendly Insurance Products at Universal Healthcare In
Johannesburg**

Author

Pitso Chaka

Date issued

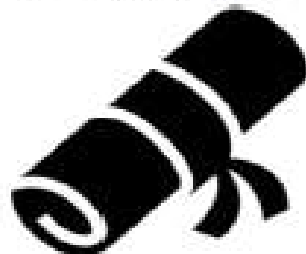
26th October 2020

This document confirms that the above manuscript was proof read and edited by Dr Richard Kamzida. The document was edited for proper English language, grammar, punctuation and overall style. The editor endeavoured to ensure that the author's intended meaning was not changed during the review.

Dr Richard Kamzida

PhD (UKZN), MA Policy Studies (University of Zimbabwe), BSc Hon (University of Zimbabwe)

Email: richardkoreuh@gmail.com



APPENDIX G Ethical Clearance Approval



26 July 2019

Mr Pitso Joseph Chaka (218024170)
Graduate School of Business & Leadership
Westville Campus

Dear Mr Chaka,

Protocol reference number: HSSREC/00000061/2019

Project title: Data analytics on customer friendly insurance products at Universal Healthcare in Johannesburg

Full Approval – Expedited Application

This letter serves to notify you that your application received on 23 July 2019 in connection with the above, was reviewed by the Humanities and Social Sciences Research Ethics Committee (HSSREC) and the protocol has been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

This approval is valid for one year from 26 July 2019.

To ensure uninterrupted approval of this study beyond the approval expiry date, a progress report must be submitted to the Research Office on the appropriate form 2 - 3 months before the expiry date. A close-out report to be submitted when study is finished.

Yours sincerely,

Dr Rosemary Sibanda (Chair)

Humanities & Social Sciences Research Ethics Committee
Dr Rosemary Sibanda (Chair)
UKZN Research Ethics Office Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4000
Website: <http://research.ukzn.ac.za/Research-Ethics/>

Founding Colleges:  Edgewood  Howard College  Medical School  Pietermaritzburg  Westville

INSPIRING GREATNESS